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**THE ROAD TO A HEALTHY
OLD AGE**

THE ROAD TO A HEALTHY OLD AGE

BY

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PREFACE

A FEW years ago Messrs. H. K. Lewis and Co. were kind enough to publish for me a small book called "The Road to a Healthy Old Age." This has been so kindly received and reviewed that I have had the temerity to write a larger book on much the same subject, and to launch out still further on to the troubled seas of morals and medicine. These two should ever go hand in hand, for if their paths diverge, we soon go wrong, and our footsteps slide; but if they march forward together with the same goal in view, they should go far in the great fight to make the crooked straight and the rough places plain.

It may seem presumptuous to try to follow in the steps of great men like Sir Hermann Weber and others who have made this subject their special study, but during the last few years the physiological discoveries of the properties of the internal glands, and greater knowledge of biological chemistry, have enabled us to do much more for the prevention

and cure of many of the morbid conditions of advancing years, and this must be my excuse.

Though this book is, perhaps, chiefly written for my medical brethren, I have tried to write it so that any thoughtful reader may grasp and understand the greater part of the argument. Whatever the verdict may be, I can only plead King David's old excuse, "Eructavit cor meum verbum bonum" (Ps. xlv.), and I humbly hope that the good word may here and there fall on good ground and bear some fruit.

We talk and write much about the management and welfare of children, and this most rightly, and we have good specialists in their diseases, but there are two ends to life. Middle life is supposed to be able to look after itself, which it does with no very striking success; but surely old age is much neglected. We have no committees of kindly philanthropic ladies, with their infallible knowledge and wisdom, to look after us and to guide our steps; and we have, fortunately perhaps, no specialist; and yet what a field for pity and for help! The *vis medicatrix naturæ* has lost much of its efficient conservative power, and old age lies almost helpless, exposed to the rough and chilly winds of life; thus old age

becomes too often a tragedy, and one that is mostly unnecessary. In this small book I hope to show some of the causes of the evil and to point out the means of prevention.

One constantly hears this remark, "Poor old So-and-so!" It is just a case of "Anno Domini," and the callous Levite passes by on the other side. The good Samaritan, however, and the good physician, the complement of each other, pause, and, figuratively speaking, pour in oil and wine, and so prolong the life and spirit that came from God.

The deplorable wastage of health, of happiness, and of time, that goes on all through life, but especially, perhaps, in old age, makes a sad contemplation. We are taught to look for a new heaven and a new earth, but we take the teaching of the Bible far too literally, and often miss the real lesson. We know, and can know, nothing of the new heaven, but we can all gird up our loins and help to make a new earth here and now, and everyone who can add to the happiness, the efficiency, and the length of life of man is helping on that great cause.

The treatment of disease in the past, and often now, is made too much of a mystery. The business of the medicine-man, in semi-

savage tribes, is a gigantic bluff to conceal his ignorance. Are we, as a profession, entirely innocent of this bluff? To get the results we want, among those who have come to years of discretion, we must be perfectly honest, for without their confidence and co-operation we shall fail. To the scientific mind of to-day, the history of medicinal treatment in the far past is a subject of marvel and of somewhat melancholy humour. One does not know which to admire most, the credulity of the patient or of the doctor. A lot of quite blind empirical treatment has been, without doubt, successful, and modern science is supplying the explanation thereof; but most of the old therapeutics were shots in the dark, or at best into the brown.

Think of the days of Squeers and Dotheboys Hall. There the attempt seems to have been to make the punishment fit the crime, but this was only a slight caricature of the treatment of those days.

I have been reading some old physicians' prescriptions of eighty years ago, written fully with all the old elaborate Latin directions. The superficial man of those days was very proud of those prescriptions, which none but a skilled pharmacist could translate, but they

mostly came into the categories of mystery and of bluff. The patient got well, or he didn't, that was on the lap of the gods, but the prescriptions were beautiful.

After centuries of darkness, but of strenuous work done under great hindrances, our profession, helped incalculably by the great men who have gone, sees the light streaming through from many sides. Our old masters have nobly laboured ; we are entering into their labours, and mankind, with God's help, will reap the harvest.

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THE PROLONGATION OF LIFE

Γνῶθι Σεαυτόν

THE ROAD TO A HEALTHY OLD AGE

CHAPTER I

THE PROLONGATION OF LIFE

Γνῶθι Σεαυτόν

“ Grant to life’s day a calm unclouded ending,
An eve untouched by shadows of decay.”

WHAT may be the nature of our occupations and interests in the next world, we know not, but that the night cometh when no man can work, and that death cometh to us all, and stoppeth all the words and works we love so well, is a desperately solemn fact.

As a matter of absolute certainty, then, we have only this life to consider; and to get the most out of it, and into it, is the main problem of our earthly existence.

If we possess high altruistic ideals and love for our brethren, as most of us do, we must endeavour to get the most out of it, not alone for ourselves, but for humanity in general. The

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monastic contemplative life of religion, if not converted into charitable altruistic action, affects the world but little. We hold our powers, our thoughts, and our knowledge in trust for humanity ; and as they depend on our health and on the continuance of life, then we should feel that we hold in trust also.

If this be our conviction, we must feel also that the years of our working powers should be prolonged to the uttermost; and so a long life and a busy one becomes our chiefest aim.

The wish to live is almost universal, but not always from the right motives; the self-indulgent luxurious man longs for the continuance of his sensual pleasures, while they *pari passu* defeat his unworthy object. The rich man often loves his riches too dearly, and, hating to part with them, becomes miserly, and so fails to get the full use and right enjoyment from them ; but the wise and good man loves his life and hopes for long days, so that they may be spent in the service and furtherance of human progress. In the early days of Christianity the belief that the world was to come to an end almost immediately, and that the Second Coming of Christ was near, blinded their eyes to the true altruistic teaching of their Master.

They became narrow and rather selfish, thinking that they alone of all the world were to be saved; of true philanthropy in any practical material sense they had but little. There were, of course, striking exceptions, like St. Peter and St. Paul, with their great missions to the Gentiles, but the mental attitude of the majority was selfish and sectarian. It is an extraordinary fact that the teaching of Christ and of His disciples did little, or I think I may say almost nothing, for the material development or improvement of man's work or physical conditions. This on Christ's part was probably part of His scheme, that mankind should work out its own evolution and happiness; on the part of His followers, the belief in His immediate Second Coming made useless any ideas of human growth or of material progress. This idea lasted for centuries, and I think it may be truly said that the first thousand years after Christ were materially the most barren in the history of the world; civilization was either stagnant or retrograde.

This attitude of constant expectation has, in a measure, paralyzed the churches ever since; it has concentrated attention far too much on the future life, and has diverted it

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to a great extent from the problems of human interests and growth here. Thus it has come about that the Church of to-day is the Church of the well-to-do and of the contented; the lower classes, who are struggling upwards from poverty and misery, find little to help them in their fight, and, indeed, are often discouraged, for many preachers tell them that they should be content with what they presumptuously call their appointed lot, and that higher worldly aims are sinful. The man who has risen from the ranks is still looked on as an outsider, instead of a man to be honoured. The ninety-and-nine just persons who need no repentance are ever a weighty drag on the wheels of human progress.

It has been cleverly said that, under the law of entail, the land of England belonged to the dead and the baby, but never to the living owner. In much the same way many good folk make the same muddle of their lives here; they spend their time in regrets for the past and in contemplative imaginings as to the life to come, and oftentimes neglect and miss their mark here. As far as we know, this life is our great opportunity, and what we make of it will be the proof of our success or of our failure. I take it that the real pass-

port into the world to come will not be the nature of our spiritual introspections here, but what we have done for the good of our times and of our brethren. This life we must use with all our highest powers for the betterment of ourselves and of humanity, but in working for humanity we must try to attain complete selflessness, and we shall need also endless patience; we must think and calculate, not in years, but in generations, and we must rarely expect to see results. Alas ! our faith is too inelastic and too shortsighted ; there is too much of the personal and too little of the racial. We must see results, or abandon the experiment. We know in our hearts that God's ways and times are not as ours, but we cannot wait for God.

Think of the enormous progress in knowledge and science that the last two centuries have brought to us, and of how we have used them. That knowledge which should have immeasurably increased the welfare of and happiness of men has been perverted and diverted into other channels. We see as the result the most wanton and destructive war, the greatest suffering and the greatest loss of life that the world has ever known. Those who deliberately planned this war could not

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wait for the good time that was clearly visible, but by murder, rapine, and robbery attempted to steal a march on God Himself.

If the gospel of humanity be combined with the simple primitive teaching of the gospel of Christ, then, and then alone, shall we begin to realize the possibilities of man, and what it is to be truly the sons of God and to be worthy of that great and honourable name.

As an old writer says, " Man was not sent upon the earth to prepare himself for existence in another world ; he was sent upon the earth that he might beautify it as a dwelling, and subdue it to his use ; that he might exalt his intellectual and moral powers until he had attained perfection, and had raised himself to that ideal which he now expresses by the name of God, but which, however sublime it may appear to our weak and imperfect minds, is far below the splendour and majesty of that power by whom the universe was made."

We have in the past set up an anthropomorphic idol, an inheritance partly from ancient times, when men worshipped devils as well as gods. This idol is a queer and impossible mixture of love and vengeance, of mercy and cruelty, of justice and oppression, and we called it God. How shall we be for-

given the profanity of this insult? Fortunately the insult has been offered not to a semihuman jealous being, but to an omniscience with whom to comprehend all is to pardon all, that sees and knows all our feebleness and blindness, and who is helping us on, in spite of ourselves, often, with our struggle towards the light. We should sit down and fearlessly, humbly, work out this problem for ourselves as far as it can be accomplished in this earthly tabernacle. We should have the courage to seek and find our merciful and all-wise Creator in the world around us, in the seed and in the flower, in growth and in decay, in life and in death, and in the slow but sure evolution of the wisdom and goodness of man.

Not the degradation of humanity, not the sins and errors of the history of his race, but the bright dawning of new hopes and new powers, and his glorious possibilities, should be our constant theme. If you make the main teaching of your sermons to boys and girls the fact that they were conceived in sin and that they are miserable sinners, they will probably and instinctively disbelieve you; but if they believe you, they will start the great adventure of life handicapped by a moral extinguisher on their unlucky heads, and much

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of their motive power will be wasted. As evolution has been the law and method of the great Creator in the material development of the universe, so must it also be in the spiritual and physical growth of man. Not the man who preaches God as the inexorable judge and avenger of sinners, but the man who shows God to be the loving Father of us all, Who would not that any should perish, but that all should come to the knowledge of His truth, is the man who preaches the gospel of Christ and humanity.

Some prejudiced person will surely say here, Religion and science were always enemies, but this is false. It is science and superstition that are antagonists, and often bitter ones. All truth comes from God, and is for our use, whether of religion or science.

Solomon, with his marvellous insight, says, "Where there is no vision the people perish." It is the history of all religions that as they grow into priest-managed rigid machines, the underlying spiritual truths, the visions, get more and more obscured, while the people turn away to other religions or perish.

This seems to me the great danger of our present times. In the awful inhumanity and wickedness of these last three years of war,

we see the Lutheran machine in Germany in its fullest vigour and in its fullest iniquity, but the vision ? Mon Dieu !

Our own Church shows many signs of spiritual healthy awakening, but it will have to throw off a lot of its priest-made traditional accretions before it can become in any real sense the Church that the people need for the fostering and preservation of their soul's health.

My apology for the foregoing presumptuous sermon must be this, that I want to impress on everyone the value of each individual life, the value of its well-being and of its continuance to the utmost limits, and to emphasize the duty we owe to God, its maker, and to humanity.

Our ambition, then, and our duty is to possess a sound mind in a sound body. A fairly healthy active mind may belong to a diseased body, as we have seen in some few men who have made wonderful artistic and literary careers, but they are sorely handicapped by the burden of the flesh, and their output of work has been necessarily curtailed; even over the strongest minds an unhealthy body has some sad influence. Many of us, who start fair in the race of life and who live by the work

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of our brains, so neglect or misuse our bodies that disease sooner or later comes to us and impairs our usefulness.

On the other hand, the man rejoicing in his strength, and spending his days in games and in sport, is apt to let his mind stand still and to become atrophied from disuse. Cicero says, "The body is apt to get gross from work, but the intellect becomes nimbler from exercising itself."

The philosophical study of both the mind and the body is our manifest duty, and to conduct this business effectually, we should learn carefully the elementary physiological laws that govern our being; this is no difficult work for the ordinary intelligent mind.

The laws that belong to and direct our eating and our drinking, our exercise and our rest, our circulation and our respiration, are fairly simple; but they must be studied, and applied to ourselves as individuals, for we are none of us built on universal lines. As we begin to get old, our idiosyncrasies especially become more marked. The foods that agree with us, and the drinks, are not always as they were, and the amount of exercise and sleep that are good for us vary considerably. The unwise physician who has studied medicine

more than men is always trying to classify us and to tar everyone with the same brush. As an example, a witty American lady was consulting one of our stomach specialists for chronic dyspepsia; he, with more knowledge than wisdom, began to lay down a rigid rule of diet, before asking her for her own experiences. She intervened with this characteristic remark, "Say, Doc., are you running this stomach, or am I?" A fair criticism. The foods we eat, the drinks we drink, even the air we breathe, are mostly under our own control, and we should carefully study their properties and their laws as they affect us personally. To prepare for and keep the mind fixed on our later years is a policy of perfection that one can hardly look for in busy sanguine youth; but, still, they should feel that the consequences of their life's actions and conduct will have, in the end, to be faced. This is a hard saying, and one that we are all inclined to doubt and ignore, but none the less true—viz., that for all the sins we commit, moral or physiological, for all the sins known and unknown, intentional or unintentional, Nature will one day send in the bill, and a bill that will have to be paid.

Most of us seem to expect, and almost all

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of us pray for a divine interposition between cause and effect, between the fault and its consequence. We expect the Almighty to stultify Himself, and the laws that He has made, by making frequent individual exceptions in our favour. Is this reasonable? Would it elevate our idea of the justice of God? or would it be for our ultimate good? Surely not. That God is a God of mercy, we firmly believe; but we cannot get away from the fundamental law—as a man sows, he shall also reap. There may be ameliorations, but the law stands.

After all, it is not a very hard road that we are asked to travel. It is only to live soberly, purely, and wisely, in accordance with fairly well-known laws; to do justice and mercy, and to give to mankind and to God of our best, whether it be of work and the fruit of our bodies, or of our minds. And if we do these things, we should, with God's help, live to a healthy old age and find peace at the last.

There are, of course, accidents and certain accidental illnesses that may come to us and that we can never entirely guard against, such as the infectious diseases, the diseases brought on by unavoidable exposure to privation and chills, and the dread but so far

unexplained cancer; there are diseased conditions also that we may unluckily inherit, but against which we can, nevertheless, make a good fight. The man who inherits a morbid constitution, and, wisely recognizing his danger lives a careful life, will oftentimes outlast a healthy contemporary in the race.

Leaving these almost unavoidable ills out of the question, we may say, with a fair amount of certainty, that our health is our own, that the diseases that may come on us as life advances are more or less our own fault, and that they are due to the breaking of physiological laws. In the great fight of life, it may be our misfortune to be knocked out in the middle rounds; but we must all strive and hope to fight to the end, to fulfil our destiny, and to leave a record of some good work behind. Habitual intemperance and the grosser sins of life are contraventions of the moral law: they carry their story and fate for all to see; but, as I have said above, the knowledge and sensible application of the laws of health will carry us to a healthy old age. As our bodily strength and activity begin to decline, it will be wise for us to get overhauled by a good physician, by one especially who can accurately estimate the condition of our

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hearts and arteries, for it is often about fifty or fifty-five that we need to make a change in our food and in our habits; it is at this age that the diseased condition of our bloodvessels, that we call arterio-sclerosis, and which cuts short so many lives, commences, and it is in these early days that so much can be done to prevent its development. This I shall go into more fully later on, but I mention it here, as some of my readers may get no further than this first chapter.

Let us now seriously consider the problems which confront everyone who has survived his youth. Whatever our conception of the future life may be, human nature clings to the existence that it knows. "Man wants but little here below, but wants that little long," is far truer than the original; and as we grow older, often, our ties to life increase, rather than diminish; for we have the welfare of our children and grandchildren much at heart, and we think, rightly or wrongly, that they need our help and guidance. It is only in the last extreme of senile feebleness that the chains that bind us to life are loosened.

But the mere duration of life is not a worthy aim in itself. What pleasure would it be to ourselves, and what use to others, if our

bodies were afflicted with disease and if our minds were useless and clouded by premature decay? To carry on both our health and our mental powers unimpaired must be our first and all-important consideration. As the old Greek proverb at the head of this chapter says, "Know and study yourself," so we should, with skilled help, make our own individualities our study and arrange our lives in accordance. No second-hand knowledge nor the experience of others will help us much, for as no two cases of illness are exactly alike, so no two cases of ordinary health run on quite parallel lines.

Temperance in all things and self-denial must be the main rules of our life; not temperance alone in eating and drinking, but in work and in play. The physical or bodily dangers of approaching age lie, nowadays, rather in the direction of over-exertion. Neither men nor women, in activity or in dress, allow themselves to sink into frumpage, as did our early Victorian predecessors; and this, if not carried to extremes, is all to the good. Elderly people can do a lot of really good work and play, but they must learn to do them both quietly and somewhat slowly.

"The pace that kills" is a proverb that

applies far more to age than to youth. This thought has often come to me through a long experience. What a number of elderly people die, if I may use such an expression, unnecessarily—that is, before their vitality and strength are really exhausted and before their work is done!

Hearts that are able to meet efficiently all the ordinary demands of life are suddenly called on to make some big effort of strength or endurance, and the result is sudden death or permanent damage to that great centre of our life.

There are three things which old age must religiously avoid: hurry, physical overstrain, and mental excitement, such as anger and temper. Indignation we cannot help often-times feeling, but we must never let ourselves go into explosions of anger. While avoiding the selfishness of the pure phlegmatic, we must still more shun the indulgence in those emotional orgies that many delight in. The late Sir Lauder Brunton on this topic said, "The patients should be warned of their condition and advised to lessen strain, either mental or bodily, if possible. There is no mental strain so risky as that of a fit of anger, and yet it is precisely in such cases of high

blood-pressure that the temper is apt to become very irritable, and angry outbursts may occur on very slight provocation, altogether out of proportion to the emotion displayed." If our hearts and arteries are not quite sound, heart failure or apoplexy may result.

"Be ye angry and sin not" has always seemed to me an unfortunate translation of St. Paul's words to the Ephesians. It is really a repetition of the words in the fourth psalm, "Stand in awe and sin not," and of these words there can be no misinterpretation.

Horace has two well-known maxims full of wisdom, "æquam memento rebus in arduis servare mentem," which may be roughly translated:

"To keep an equal mind
When things go most unkind,
Remember";

and "Rebus angustis animosus atque fortis appare," which may be still more roughly translated:

"When in a tightish place,
Don't show it in your face,
But swagger on."

The latter applies more to youth than to age, perhaps, and lies open, possibly, to misapplication. The happy mean that should exist, in

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old age, between an indolence that rapidly passes into an all-round deterioration, and over-exertion, is not easy to hit, but it is certainly better to err on the side of wearing out than of rusting out. Strictly speaking, wearing out does not belong so much to old age. In youth we probably wear out much more rapidly, but restoration or new growth takes place still more rapidly; in middle life the balance between wear and restoration is approximately equal. In old age the balance is reversed, and the ever-changing cells of our body renew themselves but slowly. This, I think, is the explanation of the fact that the retired, idle, elderly man degenerates more quickly than the busy one; the process of renewal is not stimulated, and so slowly or quickly ceases. Our bodies change probably several times during our lives, and the duration of our existence depends more on the renewing force than on the wear and tear. This applies as much to our brains as to our bodies; this force probably lies in our wonderful glandular system, for these glands linked up together by chemical and nervous forces supply, by their secretions that pass into the blood, the stimuli for the whole body.

How can we improve on the words of Cicero ?

" We must stand up against old age and make up its drawbacks by taking pains. We must fight it as we should an illness. We must look after our health, use moderate exercise, and take just enough food and drink to recruit, but not to overload our strength. Nor is it the body alone that must be supported, but still more the intellect and the soul; for they are like lamps—unless you feed them with oil, they too go out."

To go rather more into detail: age with its lessened physical work and activity needs less strong and stimulating food. Our output of work should, in a reasonable measure, regulate our intake of food, the quantity as well as the quality. The neglect of this common-sense wisdom is the source of most of the disorders and incapacities of old age. We lessen our exercise and our general activities, but we seldom deny ourselves the pleasure of the table.

If we keep a horse idle in the stable for some days, and give him the same quantity of oats as he had when in full work, we expect ructions; and if on the top of the oats we give him beans, we expect catastrophes. In like manner we, as we get old, leave off or lessen our work, but often take the same amount and sort of food.

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After a while we feel out of sorts and unfit for the little we have to do; we think we are run down—that most misleading expression; we then take more food and more stimulant, with the inevitable catastrophic results. Why should our wisdom begin and end with horses?

The stream of life, which for practical purposes is represented by the stream of our arterial blood, should be kept moving quietly and regularly, and all the excretory organs of the body should be kept in good working order by moderate and gentle exercise, and by not making too great a call on them. These organs are the scavengers of our complicated bodies, the removers of our dust-heaps and waste products, and they are absolutely essential to life and well-being. They, too, grow old with the rest of our organs, and when they are unable to carry out the work demanded of them, disease and death are not far off.

In real old age the small amount of food required to maintain life and health is surprising, and I think it often does better without meat altogether. Milk, good farinaceous and vegetable foods, eggs, and white fish or chicken, give all that is needed.

Old people are very apt to fall into grooves—of thought and of exercise, of eating and of

drinking. If these grooves are reasonable and in accordance with physiological laws, it is unwise, I think, to try reforms.

Nature in old age likes to run on conservative lines. In old age, it would seem that habits—even somewhat doubtful ones—are better than no habits at all. Without them old people often drift aimlessly and with no guide on to the rocks. To sum up, temperance must go hand in hand with self-denial, and knowledge with personal experience.

We should never look on old age as necessarily a time of disease and decay, but rather as a time of peaceful rest; of cessation of growth, but of ripening fruit. The knowledge of the world that comes from experience should keep us calm and contented and full of hope for those that come after us.

Cicero, in his charming way, said—writing when he was quite old—“ For the word ‘ spring ’ in a way suggests youth, and points to the harvest to be; the other seasons are suited for the reaping and storing of crops. Now, the harvest of old age is, as I have often said, the memory and rich store of blessings laid up in earlier life. Again, all things that accord with nature are to be counted as good. But what can be more in accordance with

nature than for old men to die ? A thing, indeed, which also befalls young men, though nature revolts and fights against it. Accordingly, the death of young men seems to be like putting out a great fire with a deluge of water, but old men die like a fire going out because it has burnt down of its own nature without artificial means. Again, just as apples, when unripe, are torn from trees, but when ripe and mellow drop down, so it is violence that takes life from young men, ripeness from old. This ripeness is so delightful to me, that, as I approach nearer to death, I seem, as it were, to be sighting land, and to be coming to port at last after a long voyage."

The mental disorders and dangers of old age belong partly, of course, to their state of bodily health, and to the sort of life that they have led; but apart from these more or less physical failings, many old people are apt to fall into a state of selfishness and—to use Jane Austen's happy alliteration—"pride and prejudice." They take a pride in their own work and achievements—a natural pride, perhaps, but one which a strict valuation would hardly warrant, and which posterity would probably ignore; and this pride naturally leads on to the prejudging of the newer ques-

tions of the day, and so inevitably to a lack of progressive thought and to a crystallization of their ideas and beliefs; and when this crystallizing process is complete, where do they stand? They can still do work, and fair work, with their old tools, but, unknown to themselves, they have joined the ranks of the men who were. And, after all, what have we old folks to be proud of? Have not our successes been fewer than our failures? and the work left undone greater than the work done?

However much we dislike them, we cannot get away from old proverbs. The ever popular one that says, "A woman is as old as she looks and a man as old as he feels," is certainly not one of Solomon's, and contains rather more of the false than the true. In more primitive simple times it may have had some worth. There are two classes of women who look younger than their age—one in whom, despite of white hair and wrinkles, the light of unselfish humanity, of sympathy and of true wisdom, shines undimmed; and one which, without much success, tries to postpone the appearances of age by art; but here I am travelling in a dangerous volcanic country, and lest evil befall, must get me back to my own

sex and to ground which is more sure and of which I pretend to know something.

That a man is as old as he feels is also not really correct, for this feeling belongs chiefly to his physical side. The real truth is that he is as old as he thinks. If he think old, he is old; if he think young, he is young, whatever the tale of his years. This applies, of course, to both sexes, and so does the next paragraph.

There are some folks who seemingly have never been young. Hide-bound by convention and tradition, they have had no really separate moral existence, and they can scarcely be said to have any real individuality. They live and think by the laws of their herd—of their sect. These are the shining lights of that blessed but presumptuous word “orthodoxy”; these are the worshippers of Mrs. Grundy—nay, they are Mrs. Grundy, and so their own worshippers.

Without doubt they make for a certain respectable mediocrity, and it may even be said that they are useful as brakes to a too enterprising community; but contented and ignorant in their impenetrable shells, they make for nowhere in the world's progress, and their lives and deaths pass like a vapour, leaving no imprints on the sands of their times.

The man or woman, on the other hand, who, refusing to become old and with the experience and accumulated wisdom of years as a check, is fully receptive of all that is good and true in the present, shines out, like a cheering beacon light, to those who are following in the upward path, in the love of knowledge, and in the love of humanity.

What a dull, hopeless, unprogressive world it would be if we were all stock size! On this subject a thoughtful comparison of men and animals becomes very interesting. Animals and birds that live in herds and flocks all strive towards uniformity; the abnormal one is hounded out. The heterodox, non-conforming rook, for instance, has a short and painful existence. This leads necessarily towards the establishment of a definite, rigid type.

This is for them, in many ways, a good thing; the herd instinct which they inherit and pass on enables them to act collectively for purposes of attack or defence, and it governs their migrations in search of food. Thus we see herds of feeble deer and cattle flourish and increase, while the solitary beast of prey tends to die out.

So far all is good for herd law, and for the

argument for uniformity, but there is no progress. The strength and wisdom of a herd of cattle, of a flock of sheep, is no greater to-day than it was a thousand years ago, nor ever will be. Certain animals, like dogs and horses, by living with men, develop a wonderful sort of knowledge and of reasoning powers, but, separated from man, they relapse in a generation or two to their old wild standard. This is the difference between men and animals, that we can pile wisdom on wisdom, skill on skill, experience on experience, inherit them and accumulate them, and this I take to be the proof of our divine origin and also of our divine destiny; but it also involves the recognition of our divine responsibility, which must mean continuous progress and growth.

Many of us, alas ! pile up experience but no resultant wisdom; stagnant, contented with our small amount of knowledge, we say, "What was good enough for our fathers is good enough for us"—the most hopeless sentiment in the world; or else either by our conduct or by our obstinate prejudices we cause our weaker brethren to offend, and so lower the tone of our community.

This herd instinct, which we see clearly active and beneficial in animals, is sneered at

by the thoughtless man; he sarcastically uses the expression "like a flock of sheep," for instance, but on reflection we see that by this instinct, for the most part, the average man and woman lives and thinks. What is Mrs. Grundy but, from the social point of view, herd tradition personified?

And to our shame it must be added that we live below our herd standard, far more often than do the animals.

We see the danger and futility of an exclusive aim at uniformity, but, on the other hand, we must not lose sight of its value. Many of us have not the ability, or perhaps the leisure, to think out all our moral and religious problems for ourselves. We have to take for granted much of the teaching and wisdom of others, and to follow in their train. This all tends to the establishment of public opinion, of a useful moral order or code, and this code governs the greater part of every community. It has not, as a rule, a high standard, for it reflects only the opinion of the mediocrity or of something a little below it; still, it helps to maintain a standard and to keep many a man on the rails. But, and a very important **BUT**, if allowed to become all-powerful, it becomes the bitter enemy of progress.

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Herd instinct in human communities, as in animals, is unreasoning often, illogical, and sometimes brutal; it easily passes on into ostracism and persecution, and then is in opposition to the Divine Will.

There are few or no ideals about it, but it makes for safety, and so must be treated with some measure of respect and deference.

It is quite futile to run quixotic tilts against it. A witty American speaker said lately: "As an upholder of order, public opinion is stronger than laws. Laws have to be executed; public opinion executes itself, and often keeps people more virtuous than the laws themselves. The fear of thy neighbour is the beginning of wisdom." This is largely true, but it does not spell *Excelsior*.

Perhaps its worst tendency is to kill or check individualism and enterprise. "Non-conformity" is a word I dislike to use, for it implies only a negation, and not a principle, but individualism is and must be the *fons et origo* of progress and evolution. No orthodoxy of herd tradition, no ecclesiastical uniformity, is going to save a soul or convert a sinner. Winston Churchill, in his powerful book "The Inside of the Cup," says: "The central paradox in Christianity consists in the

harmonizing of the individual and socialistic spirit; and this removes it as far from the present political doctrine of socialism as is possible. Christianity looked at from a certain point of view—and I think the proper point of view—is the most individualistic of religions, since its basic principle is the development of the individual into an autonomous being.

"No religious phrases, no formula nor catch-word has any saving power. The effect and desire must come from within, from the individual soul."

William Penn also says: "It is a sad reflection that many men have no religion at all, and most men have none of their own. For that which is the religion of their education and not of their judgment is the religion of another and not of their own."

Men say lightly that they are unbelievers, but rarely stop to think what it is they don't believe in. They may not believe in theology as it has been presented to them, but that is not unbelief.

No man can get away from the conviction that there must be what the Freemasons call "The great Architect of the Universe."

"There is no unbelief; whoever plants a seed
And waits to see it push away the sod
Believes in God."

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Forms and creeds are but the swaddling-clothes of wisdom's and religion's infancy. Until we can outgrow them and in a measure discard them, we shall get a dim view only of the higher truths, and of the light that shines beyond.

If throughout our whole life we clothe ourselves with them as with a garment, they will too often become the mere ceremonials of the soul's decay and death. Arthur Balfour, in his introduction to "Theism and Humanism," says: "Progress, though of small account unless it touch the many, gets its vital influence always from the few. It is to the patient labours of these rare intelligences, who possess originality, courage, subtlety, and sympathy, that we must look for the gradual working out of a theory of the universe, which shall as fully satisfy our reason and our conscience as the limitations of our faculties permit." Later on, as a sort of counterpoise, he very wisely says: "But we have not to do with intellectual values alone. There are beliefs round which crystallize complex emotions, æsthetic and ethic, which play no small part in our highest life. Without the beliefs, the emotions would dwindle; without the emotions the beliefs would

lose their worth. Though they do not imply each other in the world of logic, they are naturally necessary in the world of values." One must instinctively feel the truth of this clear and wise statement, but one must also remember that beliefs and creeds are not synonymous. Beliefs are often of divine origin, but creeds are human interpretations and formulations of such beliefs, and because they are human, full of limitations and imperfections.

In developing individualism, we must be careful to avoid the somewhat attractive pitfalls of egotism and egoism. Self-absorbed human nature soon loses its bearings and its right sense of proportion. An egotist has been wittily described as "a man who insists on talking about himself, when you want to talk about yourself." Naturally he is very apt to degenerate into a bore. The egoist is one who, in medical language, suffers from egoitis—that is, from an inflammation or exaggeration of the self, or ego. He soon becomes a mentally diseased man, and often a nuisance to all around him. Of these two the egoist is by far the worst. One has known many a good philanthropist who, in seeking the good of his fellow-men, has become, in

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his concentration and enthusiasm, a sort of egotist, but one can readily pardon him. On the other hand, in the egoist, his self-absorption, his self-aggrandizement, and his want of consideration for others, tend ever to increase and to overwhelm him.

The true unselfish individual seeks not his own gain or glory, but strives to raise the tone, the standard, and the knowledge of his community; and in doing so his individualism merges and develops into the higher altruism, which I take to be the way of Christ. He seeks after, and often grasps, the divine essence that lies hidden in us all.

As we grow older, and as the cares, the tentacles, and passions of earlier life slip away from us, the first feeling of a wise man should be to rejoice in his freedom, in the emancipation from the octopus-like arms of the world and the flesh. The unwise man often resents his freedom, and in his efforts to get back into his former bondage and to rekindle spent fires, presents rather a miserable and unedifying spectacle.

Let us aim to be of those rare intelligences that Arthur Balfour describes; let us aim to use the wisdom that has come to us from years of experience for the world, for ourselves,

and for the furtherance of the Great Architect's plans. "The true Wisdom," as Stevenson says, "is always to be seasonable, and to change with a good grace in changing circumstances. To love playthings as a child, to lead an adventurous and honourable youth, and to settle, when the time arrives, into a green and smiling age, is to be a good artist in life. Think of these two pictures: old age crabbed and selfish, hating the noise of children and laughter, scorning all opinions but those of himself and his contemporaries, and in the end sinking into the grave unloved, unmourned, with no faith in the intrinsic goodness of humanity, and with little in his God; and the other picture—a lovable old face, over which experience and humility, wisdom and unselfishness, strive for the mastery.

A concrete example of a life gone wrong and wasted is of more weight than many words. I have known well and watched this man for forty years. He had the fortune or misfortune to make a comfortable pile by the time he was thirty-five. He was a keen, capable, tireless Yorkshireman. He then retired and has never done another day's work. He was proud of his early success, and has since spent his time in crowing on his own

dunghill and in bullying his family—occupations not uncommon and clearly attractive to the human male. He has, without any vice, led a mildly luxurious, self-indulgent life. In these forty years I don't think he has done a thing that he did not want to do. He has taken no real interest in outside things and has done no public work. His intellectual and moral standards have not moved forward one inch. Now at seventy-seven, though his bodily health is exceptionally good, his mind is a chaotic ruin. Though he has a son fighting in France, he refuses to believe that we are at war. He thinks his wife is his mother, and his memory, except for the far-away events of his early life, has gone. This mental decay is not, as in many cases, the secondary result of organic disease, but is simply atrophy from disuse.

He buried his talent forty years ago, and it is now so rusted and corroded that, as a talent, it is unrecognizable. His son put the case in a nutshell when he remarked: "You can't expect a man to do nothing for forty years, and not to pay the price." The above is no doubt an extreme example, but we must all of us know of others that approach it. How rarely we realize that there is a penalty to pay for

doing nothing, for the sins of omission! We hear a lot about overworked brains, but they generally belong to underworked or perhaps diseased bodies. The average healthy brain has somewhere in it a sort of stopcock apparatus, that shuts off steam before mischief is done.

This brings us to the great question of retirement from profession or business as age advances. Some of us are retired compulsorily, some of us retire voluntarily and our blood is on our own heads, but in all cases it is what a Scotchman would call "just an awfu' risk." The momentum acquired by many years of routine work is not to be despised, and is easily lost if we get off the old accustomed rails. Some men are so fortunate as to be able to fill their lives with new interests and occupations, after their old work is done, but they are the exceptions. For the average man retirement means a slackening of the whole machine, but especially of the mental side. The old proverb that says, "The retired man is a doomed man," has much truth. One would expect that the larger part of our municipal work and government, and that also of our philanthropic institutions, would be done by retired men, but how rarely we see

it. The leading, active parts fall mostly into the hands of the still busy men, and I suppose the reason is that their minds work more quickly and efficiently than the minds of those who are out of harness. The retired man has often no appreciation of the value of time, and so becomes prodigal of it. Yet there should be a lot of useful work that the idle man should be well able to do, and work which would save him from deteriorating.

Since the war began, there are thousands of posts which have been efficiently filled by the men on the shelf, for the nation's good and for their own. The much-bepraised hobby is useful, but most of them give too little intellectual exercise. It is far easier for the unemployed man to keep his body fit than his mind, and yet the true and only happiness of our later years hangs on this. After all, it is the absence of incentive, with its consequent lack of keenness, that is the real trouble. It is the old difference between the man who takes a walk to get an appetite for his breakfast and the man who takes a walk to get a breakfast for his appetite. There is the incentive in both cases, but one of very unequal force.

The eyes of the coming generations are

upon us, looking for help and guidance. Let us show them minds wise and open to all new truths and developments, and let us not allow the approach of age to sink ignominiously into its reproach.

To revert to the first danger of old age—selfishness. This oftentimes creeps on us insidiously, though the accusation of such a thing would fill us with indignation; but it is there, unless we keep a very keen guard.

Our children perhaps spoil us, and we unconsciously slip into the habit of thinking that the tit-bits of life belong to us as a right; or, living alone, we arrange our lives on a mildly luxurious plan, and then think ourselves very hardly used if circumstances break into and disturb the monotonous order of our existence. We may perhaps have earned a place in the sun, but its size should not be too conspicuous.

The pride of old age—generally a false pride—is too often shown in our attitude towards youth. We often set an undue value on the wisdom that is supposed to come from years of experience, and we expect youth to accept our valuation and conclusions without question; whereas in reality we old people have more to learn from the young than they from us. Our failures and disappointments have inevitably

blunted the keen edge of our courage. While we are weighing chances and seeing all the lions in the path, youth, with its fresher knowledge and greater, if blinder, pluck, will often arrive. Bacon says: "Men of age object too much, consult too long, adventure too little, repent too soon, and seldom drive business to the full-period."

"Let not him that putteth on his armour boast himself as he that putteth it off," is excellent advice for youth; but the converse is equally good for age: "Let not him that putteth off his armour boast of his past and the great things he has done," but rather let him help his sons and successors to put on better armour and to fight a better fight. The *laudator temporis acti*, the man who says, "The country, sir, is going to the dogs," is an anachronism and generally a bore, and to be this is no longer the privilege of old age, though it is still one of its great temptations. The habitual bore has for all intents and purposes outlived his usefulness. He is like a long and dreary sermon, the persuasive power of which is in inverse proportion to its length.

To quote once more Stevenson's inimitable words: "In short, if youth is not quite right in its opinions, there is a strong probability

that age is not much more so. Undying hope is co-ruler of the human bosom with infallible credulity. A man finds he has been wrong at every preceding stage of his career only to deduce the astonishing conclusion that he is at last entirely right."

Let us, then, sink our selfishness and self-esteem, and renew our youth by sympathy, and if possible by co-operation with our sons; and not only by co-operation, but by co-play. What a poor sort of bond there is between sons and a father who is regarded as little more than a paymaster! But if he is a playmaster also and can lick them at golf or tennis, he is a much respected person, and one whose opinion will carry weight all round.

Let us, then, help on the succeeding race by encouragement, by advice very gently given, and by occasionally but very silently putting on the brakes; and let us never forget that, in the words of the Irish bull, "Their future is all in front of them, while ours, alas! is behind us."

Now, as we cross that ill-defined boundary-line that marks the advent of old age, we must not make ourselves miserable. Remorse we must have, most of us, for things done and

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regrets, all of us, for things left undone, and for all those great ambitions and hopes that have gone astray; but the morbid analysis of the "might-have-beens" leads nowhere and solves nothing.

Though we can no longer, perhaps, be in the fighting line, we are still soldiers in the great army of the living. If we cannot ride with the guns or charge with the bayonets we can still hold the fort, and by cheerfulness, endurance, and unselfishness can do much to help those who are fighting the great battle of life. And surely the life has been worth the living, and the play the playing. If we no longer have the keen sight of the young men in the front row of the stalls for all the beauties of the stage and its players, if we can no longer catch all the delicate points of the dialogue, yet we, who see from the back rows, get the *mise en scène* more perfectly, and see things in truer proportions and perspective.

Listen to Cicero once more, who puts these words into the mouth of Cato, then eighty years of age: "My wisdom consists in the fact that I follow nature, the best of guides, as I would a god, and I am loyal to her commands. It is not likely, if she has written the rest of the play well, that she has been careless about

the last act, like some idle poet. For after all some last was inevitable; just as to the berries of a tree and to the fruits of the earth there cometh in the fulness of time a period of decay and fall. A wise man will not make a grievance of this. To rebel against nature, is not that to fight like the giants against the gods?"

That was written two thousand years ago, and I hope my readers, if such there be, will pardon me for quoting Robert Louis Stevenson again, that great and kindly philosopher of our own time, who, though he died young, seemed to have grasped the prophetic vision of all ages: "Indeed, by the report of our elders, this nervous preparation for old age is only trouble thrown away. We fall on guard, and after all, it is a friend who comes to meet us. After the sun is down, and the west faded, the heavens begin to fill with shining stars. So, as we grow old, a sort of equable jog-trot of feeling is substituted for the violent ups and downs of passion and disgust. The same influence that restrains our hopes quiets our apprehensions; if the pleasures are less intense, the troubles are milder and more tolerable; and, in a word, this period for which we are asked to hoard up everything as for a

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time of famine is in its own right the richest, easiest, and happiest time of our life."

Let these cheering words of these two great philosophers help us to march bravely on, and to use for ourselves and for others the very best that remains to us of life and work.

To some of us may come that great trial, the loss of sight or of hearing, losses which seem to cut us off, to a great extent, from the joy and intercourse of life, and which, to some extent, paralyze our usefulness; but even then we must fight on and train the remaining senses to compensate for what is lost. As a comfort to these I must quote the prayer from Whittier's beautiful poem " My Birthday ":

" And if the eye must fail of light,
The ear forget to hear,
Make clearer still the spirit's sight,
More fine the inward ear.

' Be near me in each hour of need,
To soothe, or cheer, or warn,
And down these slopes of sunset lead
As up the hills of morn."

When, for each one of us, the sun begins to set and the long day closes; when the fear of death—that phantom born of faithlessness and doubt—stands over us, we must steadfastly look through him and beyond him to the Better

Land, to the Light that never fails; for this is not our home. Let us have no dread of the so-called pains of death. They are a chimera. Death comes kindly and gently in unconsciousness, in coma, or in sudden failure of the heart. During the last three centuries in Britain and America the outlook on the future life has been to very many coloured and clouded by the teaching and doctrines of Calvin. I doubt if two good men ever—unconsciously, of course—did more to blurr the true idea of God as an all-loving Father than did Calvin and John Knox. The aspect of religion they presented has now, thank God, nearly died out, but it has left on many minds an indelible mark. To those of us who were brought up in this stern subsection of the Christian religion, to those who for fear of death were all their lifetime subject to bondage, emancipation has been very difficult. But looked at honestly and squarely, this fear of death implies a great want of trust in our God.

Compare these harsh Calvinistic beliefs with the happier faith of Dante, who says: “ In this age the noble soul tenders itself unto God, and awaits the end of this life with much desire; and to itself it seems that it goes out from the inn to return to the Father’s mansion;

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to itself it seems to have come to the end of a long journey, and to have reached the city; to itself it seems to have crossed the wide sea and to have returned to port."

Finally, I would humbly say this: If the old Greek philosopher could look on death as his last and best friend, if the Buddhist can calmly wait for it, and if the Mohammedan can fearlessly welcome it, surely to the Christian death should be the apotheosis of his existence, the *janua vitae*, the very gateway into knowledge and eternal life.

Listen to Whittier again:

- " Far off, and faint as echoes of a dream,
 The songs of boyhood seem;
Yet on our autumn boughs, unflown with spring,
 The evening thrushes sing.
- " The hour draws near, howe'er delayed and late,
 When at the eternal gate
We leave the words and works we call our own,
 And lift void hands alone.
- " For love to fill, our nakedness of soul
 Brings to that gate no toll;
Giftless we come to Him who all things gives,
 And live because He lives."

**ON THE VALUE AND
DIGESTIBILITY OF FOODS**

CHAPTER II

ON THE VALUE AND DIGESTIBILITY OF FOODS

As our whole life and well-being depend on the proper digestion of our food—air and water, the two other necessities of life, fortunately needing no such elaborate process of absorption—the management and choice of our food becomes a matter of the greatest importance.

It would seem to the casual observer that, in youth especially, we can afford to make foolish experiments and mistakes in our diet, to go too long fasting, to take far too much at one time, and to eat the most incongruous mixtures; for in a day or two we seem to be all right again. Our animal economy is, luckily for us, so wonderfully made and planned that it is able to meet almost all demands and emergencies in the way of food, and to get rid of the resulting waste and poisons; but this is not strictly true. Every excess in eating and drinking, every unnatural call on our digestive powers, leaves some mark, invisible perhaps, on our reserve of power. We vary, of course,

as individuals, enormously in our powers of assimilation, and in the immediate penalties we have to pay for our mistakes; but that is a reason why each man should find out his personal equation, and so in early life, while recuperation is the law, learn the lessons of self-denial and self-management. The man who can commit excesses apparently with impunity, the man who boasts that he has never had a day's indigestion in his life, comes to grief in the end long before his proper time. It would seem that our wise Creator has planned us for imperfection rather than for perfection, but in reality that we should attain perfection through the lessons and sufferings of our imperfections.

As our years advance we can still less afford to make mistakes, for we recover more slowly or not at all, and our excretory organs, that clear away our rubbish-heaps, are not up to any new or additional strain of work. Hence come gout, rheumatic affections, kidney disease, and nearly all the troubles of old age.

The problem is not, perhaps, so much the food, as we grow older, but the quantity. Many of us, in old age, improve in our digestions; foods that used to make us bilious, for instance, we can often digest quite well. The

man or woman, the sufferer from sick-headaches and migraine, generally loses them after or before sixty. It is difficult to explain this, but it is partly due to lessened nerve-strain.

Let us briefly consider the whole progress of digestion. It begins in the choice of food; it then belongs to the kitchen or the cook. If we can control these first two problems, we come to our bodies. The first and very important question arises, Can we masticate our food? As we grow older our teeth generally become less perfect in their work, and it is here that a good dentist can do so much to help us. But how often we avoid him and put off the evil day! Though we may have lost a tooth here and there, we say we have a good lot left, but a healthy tooth without a *vis-à-vis* in the opposite jaw is dancing a *pas seul*. It may be an interesting performance for the tooth, but its original purpose, that of a grinder, is not being fulfilled. In fact, many old people do better with no teeth at all, than with some here and there that do not meet. The toothless gum often becomes in time a fairly efficient masticator, but its food, of course, needs common-sense selection. The imperfect mastication and pulping of our food means necessarily the

imperfect mixing of that food with the saliva; the saliva is not merely a lubricant, but is the first agent in the chemical process of digestion, for it transforms the starch of our food into something that can be absorbed. Imperfect mastication means, also, that the food is swallowed more or less in lumps, and so gets imperfectly mixed with the gastric juice in the stomach.

Sir Andrew Clark's dictum was this in reference to the importance of good mastication: "Thirty-two teeth in one mouth, thirty-two bites to every mouthful, and for any tooth that is gone the number of bites to be proportionately increased." The knife and fork can be made to do much of the work of the teeth, but they do not supply the saliva. Here one must say a word on the variation of one's diet. If our stomachs were like a big test-tube, into which we put certain ingredients and apply to them certain chemical agents at a certain temperature, the process of digestion would be shown by a mere chemical formula; but the chemical agents that do our work are not always on tap, or they vary in amount and in strength. They are produced in answer to the calls of our nervous system, and are not mere automatic productions. Thus it is that

appetizing food and the smell of well-cooked food acting through our nerves cause a good supply of saliva in our mouths and of the gastric juices in our stomachs.

This explains the value of wholesome condiments such as salt, mustard, and pepper, and the different effects of well or badly cooked food. Monotony in diet has a dulling effect on the nerves that govern our digestions, just as continual sameness has on our lives generally. We may design a perfect diet from a chemical point of view, but the monotony of it will cause it to disagree in time. One may live on mutton-chops and rice-pudding and feel that one has a lump of lead in one's side, and one may then go out in pleasant, cheering company and eat one's way steadily through a dinner of many and varied courses, and digest it perfectly, and in the end feel all the better for it.

Our nature seems to crave for change, and our stomachs seem the better occasionally even for a shock. Enjoyment of food is not essential for digestion, but is a great help.

In support of this argument for change, one cannot help telling the story of the Eton boy who had to write an essay on the ancient Greeks (the humour was of course unconscious).

He said : " The custom that a man should have only one wife was first instituted by the Greeks ; they called it monotony.'

This dependence of our digestive powers on our nervous system points also to other things, to the importance of not coming to our meals in a state of nervous or physical exhaustion. Many an elderly person does far better with a rest before food and after, and not distracting his nerve powers by reading continually while eating. Anxiety, grief, and trouble, as we know to our cost, affect our digestions, but they are often outside our control.

When we have swallowed our food, the digestion by the gastric juice begins ; this process lasts for varying times, according to the nature of the food, but it always needs time for its work, and it should not be hurried. It is a mistake to eat one course too quickly on the top of another, and it is a mistake also to start the busy actions of life till the digestion is well on its way. The busy man should make his chief meal when his work is done, while the idle man had better, perhaps, make it in the middle of the day. This last applies particularly to old people, for at that time they have more nerve energy, and their sleep at night is better for not having partially digested

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food in their stomachs. Really old people do better, I think, with little or no animal food in the evening. The breakfast and the early dinner should be their important meals.

The question of the nature or constituents of our diet in old age is a very important one. Clearly by nature man was formed for a mixed diet, and old age should continue it, but with variations and discretion. As I have said in my first chapter, the quantity of one's food should be regulated in a measure by the mental and bodily work we do, and in healthy old age a wise quantity is of more importance than quality; there is no reason why we should not eat a moderate quantity of meat, but if there is a tendency to arterial disease, to thickening of our arteries, and to abnormally increased blood-pressure, then meat should be very sparingly taken, and that not every day. Beef, pork, and veal are more injurious probably than mutton and lamb. Here the diet should certainly be in the direction of the vegetarian, with the supplement of eggs, butter, cheese, and wholesome white fish, such as soles, plaice, whiting, flounders, and brill. Salmon and mackerel are probably rather injurious.

Of the vegetable foods the pulses, in such

cases, such as beans and peas, are not so suitable as the cereals. Old folks who are knocked off their meat eat as a rule too little fat; there is very little fat in fish or in birds, but with red meat the fat is so mixed up with the muscular fibres or lean, that they eat a good deal without knowing it. This want of fat is best supplied by good bacon, hot or cold. Many of us certainly know from experience that cold boiled bacon, especially in winter, is the wholesomest form of animal food that we can find. Dr. Harry Campbell says this: "The ideal dietary, the most suitable diet for the aged, is that which constitutes the ideal diet for man in general. Such a dietary demands (*a*) moderation in quantity, (*b*) simplicity in quality, and (*c*) the avoidance of those starchy foods which are apt to slip into the stomach without having been first well mixed with the saliva.

" A moderate diet is one just sufficient (supposing the various foodstuffs, fats, proteins, etc., to be properly balanced) to maintain a person at the lightest weight consistent with the most perfect health of which he is capable. It is manifest that any food over and above this sufficiency can do no good and may do harm.

" By a simple diet is meant one consisting

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of such items as bread, plain biscuits, plain puddings, plainly cooked vegetables, fruit, meat, fish (all plainly cooked), milk, butter, cheese (such as cheddar), tea, coffee, cocoa, salt. Dishes calculated to tickle the palate are *not* included in the simple diet. A simple diet excludes alcohol and all condiments other than salt and occasionally pepper and mustard.

“ Avoidance of soft starchy foods. All through life starchy foods should be taken, as far as possible, in a form compelling thorough mastication.”

The indigestibility of starchy foods is, in a measure, overcome by the use of well-made malted or predigested foods.

The scientific study of diet has shown that certain quantities are necessary for the maintaining of life; these foods and quantities represent a minimum, but the difficult problem is to find out how much food, and what is necessary for the maintenance of life in its fullest activity, so that the greatest output of work can be obtained. The overstepping of this amount, when long continued, leads inevitably to disease; the diminution leads also inevitably to debility and inefficiency.

These quantities, etc., have been worked out into what are called “calories.” Roughly

a small calorie is the amount of heat required to raise a gramme of water through 1° Centigrade, and the large calorie (which is used now in most books on this subject) is a thousand small calories. This is no place for a complete scientific explanation of this subject, but briefly stated, "the caloric value of any food can be determined by a calorimeter, and is a measure of the energy which is given out by the complete oxidation of the substance." The above is a quotation from Dr. Spriggs' article in "A System of Diet and Dietetics," edited by Dr. G. A. Sutherland, and what follows is also from the same article:

"We have seen that the common experience of mankind and the evidence of scientific inquiry agree that a sufficient amount of food must be taken daily to yield from 2,500 to 3,000 calories. When we come to inquire of what constituents this food should consist, we find a general agreement upon fundamental points, but a great deal of difference of opinion upon others. It is established that the dietary of man should include all three food-stuffs, protein, fat, and carbohydrate. The protein is essential: no other material can supply the loss involved in the wear and tear of living organs. No other food-stuff can entirely

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supply the needs of an animal as protein can those of the carnivora. In the case of man, a healthy existence cannot be supported upon protein without carbohydrate, and it is a great advantage to him to have fat in his diet as well, since fat gives a greater proportion of energy, weight for weight, than carbohydrate or protein. We have seen that protein furnishes material for the metabolism of structure, whilst carbohydrate and fat, and any protein in excess of that required for structure, furnish energy for the metabolism of function, or put in another way, fuel value to supply heat and work. Two points arise for consideration: first, What is the minimum amount of protein which is essential for existence? and secondly, What is the amount which is desirable in order to maintain the body in the highest degree of efficiency? The first question we can answer upon the evidence before us, but there is considerable disagreement on the second. Provided that a certain minimum of protein be supplied, and sufficient caloric value, an active life can be supported upon very varying proportions of the three elements. This fact must be clearly borne in mind. Any experiments showing that men can live and work for long periods upon this diet or upon that, provided

that the constituents satisfy the above fundamental condition, show us nothing new. Men have existed in the past, in the vicissitudes of wealth and poverty, freedom and captivity, upon dietaries as varied in both quantity and quality as will ever be designed by experimentalists. The main object of our inquiry must therefore be not to determine upon how much or how little a man can live, but what are the proportions of the food-stuffs upon which he can live with the greatest efficiency and economy."

It must be evident that, as our work lessens and our age increases, a less amount of food than the full work average will be needed, and we must remember that the quantity of food must bear some relation to the weight of the body. In the above quotation protein (often known as albumen) is contained in all animal foods, in eggs, and in smaller proportion in cereals and pulses.

That the protein is derived from the animal or vegetable source is not of much consequence.

The carbohydrates are represented by what we call starchy foods, such as vegetables, cereals, pulses, and sugar; and the fats are the fats of meats, butter, animal-oils derived chiefly from fish, and to a lesser extent vege-

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table oils, as olive oil. The amount of protein required varies a good deal with the nature of the work demanded.

The consideration of the principles on which diets are constructed has led us to the following proportions of food-stuffs for a man of 11 stone, leading a life of moderate activity:

Protein ..	100 grammes	=	410	calories.
Fat.. ..	100 ..	=	430 ..	"
Carbohydrate	360 ..	=	1,480 ..	"
Total heat value	.. ..	=	2,820 ..	"

This is almost exactly given by bread, 1 lb.; meat, 4 ounces; eggs, 4 ounces (two small ones); cheese, 2 ounces; potatoes, 1 lb.; butter or other fat, 2 ounces; milk, $\frac{1}{4}$ pint; sugar, $\frac{1}{2}$ ounce.

For a man or woman of $9\frac{1}{2}$ stone an adequate supply would be, bread, 12 ounces; meat, 6 ounces; potatoes, $\frac{1}{2}$ lb.; butter, 1 ounce; milk, 1 pint; sugar, 1 ounce; milk-pudding, 8 ounces; soup, 1 pint.

This is the ordinary diet of St. George's Hospital, and contains protein, 90; fat, 75; carbohydrate, 330; calories, 2,400; and is designed and is sufficient for those doing no work.

Dr. Spriggs says in conclusion that we may

adopt Atwater's standard as embodying the results of modern investigations into the diet of adults:

	<i>Protein.</i>	<i>Calories.</i>
For women with light muscular work ..	90	2,400
For women with moderate muscular work ..	100	2,700
For men without muscular work ..	100	2,700
For men with light muscular work ..	112	3,000
For men with moderate muscular work ..	125	3,500
For men with hard muscular work ..	150	4,500

As we get on in life it will not be difficult from the foregoing tables to construct a diet which, while giving changes, will approximately supply all we need, and which will not by excess of one or other constituent put too great a strain on our organs of elimination, such as the kidneys. The amounts of food needed will, of course, vary not so much with the number of one's years as with the muscular work, in the shape of exercise that we are able to take.

The tables by Dr. Spriggs (pp. 74, 75) classify the common foods according as their energy-giving is due to protein, carbohydrate, or fat. It will be noticed that milk is the only food in the lists which contains a good proportion of all three. Cheese, Brazil nuts, and bread, are represented in each list and contain a fair proportion of at least two of the food-stuffs.

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For experimental purposes these foods were tested singly, but in an ordinary mixed diet the problem becomes a good deal more complicated. The admixture of some foods will

COMMON FOODS ARRANGED IN ORDER ACCORDING TO THEIR VALUE IN PROTEIN, CARBOHYDRATE, AND FAT.

<i>Percentage of Total Heat Value of Food Furnished by its PROTEIN.</i>	<i>Percentage of Total Heat Value of Food Furnished by its FAT.</i>	<i>Percentage of Total Heat Value of Food Furnished by its CARBOHYDRATE.</i>
Per Cent.	Per Cent.	Per Cent.
Lean Beef (boiled) 90	Butter 99	Tapioca (cooked) 98
Oysters .. 89	Bacon 94	Prunes (dried) .. 97
Chicken 79	Cream 87	Figs (dried) .. 95
Mackerel 50	Brazil nuts .. 86	Rice (boiled) .. 89
Skim milk 37	Fat ham .. 81	Potatoes (boiled) 88
Eggs 32	Fat beef .. 75	Bread 81
Beef with fat 25	Cheese 73	Peas 72
Cheese 25	Eggs 68	Milk 29
Fat ham 19	Boiled mutton .. 65	Cream 8
Milk 19	Milk 52	Brazil nuts .. 4
Bread 13	Mackerel .. 50	Cheese 2
Potatoes 11	Chicken .. 21	
Boiled rice 10	Boiled lean beef 10	
Brazil nuts 10	Bread 6	
Bacon 6	Bananas .. 5	
Cream 5	Potatoes .. 1	
Bananas 5		
Butter 5		

probably hasten digestion, while that of others may hinder it; these gastronomic peculiarities and vagaries are discoverable only by personal and often bitter experiences.

If we take, for instance, the figures of lean beef in the first and second column—viz.,

Lean beef ..	$90 + 10$, we get its value.
Chicken ..	$79 + 21$, we get its value.
Bread ..	$13 + 6$, + 81 its value.
Cheese ..	$25 + 73$, + 2 its value.

By roughly arranging foods according to such a table, we can arrive at the proper balance of its various constituents.

Again I must remind my readers that the chemical side of the problem is not the only one to study. Idiosyncrasy, appetite for certain foods, distaste for others, and personal experience, must all enter into the question. The appetite for certain foods varies much at different periods of life. Fat, for instance, is abhorrent to many children, and their lives and digestions are made miserable by the parental but unscientific command to "clear up their plates."

In later years the same person will often welcome fat and need it. Sugar, again, is loved by children, scorned often by middle age, which supplies its place partly by wine and beer, and is again welcome and often very useful in old age, for it helps much to keep up the failing heat of the body. In hearts that are growing old and feeble good cane-sugar

is a direct food for the weakening muscle of that most important organ. Plain sugar added to food or drink is more digestible, I think, than sugar in the form of preserves—the latter is more likely to turn acid.

The digestibility of food is not governed necessarily by its chemical composition, and here our own experience, again, and that of others should be a guide. There is as much nourishing material in twice-cooked as in once-cooked meat, but most people digest it with far more difficulty, and one does not get as much nourishment out of a food that one's stomach manages badly, for there are certainly more waste products produced which are never absorbed.

The digestibility of new and stale bread varies much with most people, but the contents, of course, are the same chemically. Hot fat and cold fat, again, differ much in their wholesomeness. To many hot fat is too rich and makes them bilious; while cold fat agrees perfectly. We see this particularly in the use of hot and cold bacon.

All these things we must study and observe each man for himself, and we must not let our likes and our appetites influence and

sway the conclusions of our knowledge and of our personal experience.

The following table, representing the experiments of various authors and compiled from Hutchison's "Food and the Principles of Dietetics," gives the length of time which the various foods were found to remain in the stomach:

	<i>Hours.</i>		<i>Hours.</i>
Beef, raw ..	.. 2	Beef, half roasted	3
,, boiled ..	3	,, roasted ..	4

The digestibility of mutton has been found to be about the same as that of beef. Pork requires a longer time than mutton and beef, and veal appears to occupy an intermediate position.

	<i>Hours.</i>		<i>Hours.</i>
Bread, $2\frac{1}{2}$ oz. ..	$2\frac{1}{2}$	Fish, salt ..	.. 4
Eggs, two lightly boiled ..	$1\frac{3}{4}$	Apple, raw, $5\frac{1}{2}$ oz. ..	$3\frac{1}{2}$
,, raw ..	$2\frac{1}{4}$	Cabbage, $5\frac{1}{2}$ oz. ..	3
,, poached with butter ..	$2\frac{1}{2}$	Cauliflower, $5\frac{1}{2}$ oz. ..	$2\frac{1}{4}$
,, hard-boiled ..	3	Potatoes, $5\frac{1}{2}$ oz. ..	$2-2\frac{1}{2}$
,, as an omelette ..	3	Lentils, boiled, $5\frac{1}{2}$ oz. ..	.. 4
Fish, 7 oz... ..	$2\frac{1}{2}$	Peas, 7 oz... ..	$4\frac{1}{2}$
		Rice, boiled, $2\frac{1}{2}$ oz.	$3\frac{1}{2}$

THE PROLONGATION OF HEALTH

CHAPTER III

THE PROGLONATION OF HEALTH

“The truest courage lies,
Not in unseeing eyes,
Owning no danger, blindly rushing on;
But in the eye that sees
To grasp the golden keys
Of power and circumstance, and make them one.”

AFTER the attainment of maturity, the human body in health remains almost at the same level, as far as physical changes are concerned, for many years. This period of comparative perfection should last for forty years or more. There are, of course, certain slight changes, such as the tendency to increased weight, to the increase of fat, and to the lessening elasticity of heart and arteries; but, generally speaking, the prime of life, as it is called, the life on the mountain-top, should go on for about forty years, and this rule should apply to both bodily and mental powers. But in time there commences a series of changes which are known as senile decay.

That wise physician Milner Fothergill graphi-

cally describes the oncoming of this condition thus: "Such changes are easily recognized in the very old; but they are commonly overlooked until their existence is almost forced upon the attention of the observer. This is unfortunate, as it is often a matter of great moment, in the recognition of the true state of the case, to be able to detect the early evidences of impending decay. The process is normally a slow one, and consequently the first changes must be insidious and occult. Not only this, but they will be very slowly developed. This, however, forms no reason why these changes should be overlooked, and that their significance be omitted from our estimate.

" Many people, even medical men, have irrational notions about their health and their tissues. The idea that there may be atheroma in their bloodvessels, that there is a commencing hypertrophy of the heart, or that their kidneys are no longer sound, is sufficient not only to perturb them, but to set them to work at once to prove, at least to their own satisfaction, that they are free from the slightest taint of commencing decay. If it were merely a subject of self-satisfaction to the individual, it would matter little; but, unfortunately, such

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attitude and conduct stand in the way of a proper comprehension of the slow and gradual progress of the chronic changes. These prejudices foster ignorance; and that ignorance often assumes an aggressive character."

Since that was written, forty years ago, our means of investigation of these early changes have become more accurate and scientific, and our means of treatment more scientific and successful also. It is only in these early stages of downward progress that we can expect to do much to arrest or to cure. If the symptoms and changes are allowed to pass on, till definite structural alteration of the tissues arrives, we can only spend our efforts in patchwork repairs and in making the inevitable descent as easy as possible. The mere prolongation of life were an object scarcely worth the seeking, if we could not at the same time hope to prolong the health and strength of both body and mind.

There can be no more pleasing sight or companionship than old age, free from suffering of body and with mind serene and mature, and there is certainly no more distressing sight than old age borne down with infirmity and with mind clouded and unhappy.

Job says in his inimitable words: "Thou

shalt come to thy grave in a full age, like as a shock of corn cometh in in his season." This should be our ideal, to help our Creator towards the fulfilment of His handiwork. Most of us in our self-indulgence and ignorance spend our early and middle years in tearing up His kindly plans, and later in bewailing our misfortunes. Self-indulgence or any form of intemperance is a sin for which we shall have to pay here, and ignorance of such vital concerns as our health and well-being comes perilously near to a sin, for it is God's work that we are spoiling and His plans that we are frustrating; and can there be any knowledge more important or more worth the getting? Froude says: "The knowledge which a man can use is the only real knowledge, the only knowledge which has life and growth in it, and which converts itself into practical power. The rest hangs like dust about the brain, or dries like raindrops off the stones."

What should be the average duration of life in man is as yet an unsettled problem. That the duration of his life has much increased during the last hundred years is undoubtedly, as the statistics of all insurance offices show, but how much of that is due to lessened infant mortality is not quite clear.

That the limit of life, in healthy people who have lived temperate, careful lives, should be a long way beyond three score years and ten must be considered certain. For generations as a race, if not as individuals, we have done nearly all in our power to shorten life, by over-feeding generally, by over-stimulation often, and by living and sleeping in close, badly ventilated, sunless, unsanitary houses. We seem to have lost the intuitive knowledge of what is good and bad for us, that most animals possess.

Some enthusiasts claim that vegetarianism is the one rule of life, but observation of the animal kingdom does not support any such theory. The raven, which is almost exclusively a flesh-eating bird, lives nearly one hundred years, and so do many of the larger parrots, which are vegetable feeders. What is the average duration of life in the large carnivora, such as lions and tigers, in a state of nature, it is almost impossible to gauge, but the domestic cat is not of long life. Elephants, which are vegetarian exclusively, live to very great age, 150 to 200 years, but horses and cattle, also vegetarians, seldom live beyond 25. The larger tortoises, which are probably the longest living animals known, living 300

to 400 years, are some of them insect eaters and some vegetable eaters. That their various organs, such as mouths, teeth, limbs, etc., are all planned in accordance with their feeding habits goes as a matter of course.

Roughly, I think, there exists a law something like this. The time or number of years it takes for an animal to arrive at full maturity regulates the length of life. An elephant takes about forty years to get fully mature; multiply that by two, and that roughly represents his period of full strength. Another similar period represents his gradual decline; thus $40 + 80 + 80$ makes 200 years, which seems to be his limit. A dog takes 2 to $2\frac{1}{2}$ years to get fully mature; $2\frac{1}{2} + 5 + 5$ makes $12\frac{1}{2}$. A horse $5 + 10 + 10$. A man arrives at maturity about 20. His life should therefore be $20 + 40 + 40$, which makes 100. Whether the same rough law holds good in birds and fishes is very difficult to establish. Some fish, as carp, which grow very slowly to a great size, are very long-lived. I was at Versailles in 1872, and in one of the ponds there a big carp came up to be fed, as they have done for years; he had a silver plate let into the back of his neck, which showed that this was affixed before the great French Revolution, so he must have been eighty years old at least.

That we, as a race, have failed to make the most of our lives must be regarded as a certainty. We all of us know men and women over ninety, in good health and in possession of their mental faculties; and as sanitary, physiological, and sociological science grows, so must the duration of man's life. Ninety years should be our lowest ambition.

Old age is inevitable, and death of course is inevitable, but that miserable fiasco we call senility is not a law of nature. It is, on the contrary, evidence and proof that the law has been broken, by ourselves, by our forebears, or by both, and it emphasizes the importance of the inheritance that we hand on to our successors. But are we to remain stationary and satisfied with the laws of nature as we read them to-day? Is there to be no evolution of law as of life? What we call law is much the same as that crippling word "normal." I am not speaking now about a normal temperature of the body, nor about the normal constitution of inorganic matter—though as for these things we may be able to perceive in our short lives what is only a temporary normal, a point which in the infinity of time may be slowly rising—but about the normal in moral thought, in philosophy,

and in the science of life. An actual normal point is in reality non-existent; it merely represents an approximate present average. Yet it is one of those words, like "orthodox," that obsesses us, and that the unthinking mind regards as almost sacred; but the reasoning mind cannot fall down and worship an approximate average. This reverence for the normal is almost a gospel of despair; it produces nothing but mediocrity, and is an obstruction in the path of progress. Is the old age-limit of three score years and ten, dating back from David, to remain our normal standard still? Surely not. The average duration of life and working years is steadily increasing, and their limits and possibilities are not yet in sight. The normal of to-day should go on steadily growing into the sub-normal of to-morrow; we may have to think in years or centuries in place of days, but a healthy discontent or a natural ambition should ever be driving us on towards an ever-retreating goal. This great result is not going to be attained by any royal or easy road, by this or that man's medicine, by sour milk or by any other food fads, but by an all-round application of scientific and logical thought; by improved sanitation, and by a wise and

temperate reform of all that belongs to our moral and physical lives. A democracy, the ideal form of government, is good or bad according to the character of the people who form it, and is an unerring reflection of the average of their development; but it nearly always contains an aristocracy, not one of birth or wealth, but of wisdom and knowledge, which is working to raise the standard of the whole body politic. In like manner we physicians and all the aristocracy of Science should ever be striving to raise the standard of physical and mental health in the demos of the world, which is in a measure entrusted to our care. That dream, the elixir of life, has not been discovered, but the researches into the action of the internal glands, which Brown-Séquard introduced to the world on June 1, 1889, have in a way revolutionized medicine. Biedl eloquently says: "As the founder of the doctrine of internal secretion, Brown-Séquard has opened to Physiology a new and fruitful field for experiment; he has paved the way for the right understanding of many pathological derangements; and he has pointed out a rational and, in many cases, a remarkably successful method of treatment."

Our present knowledge of these glands is but

superficial, but we already know enough to see their power and in some measure their possibilities in the treatment and postponement of senile decay. We shall preach and we shall practise, we shall fall, as did Metchnikoff, by the way, and we shall be jeered at as mad prophets who stultify their own prophecies, but in the true spirit of altruism we must march steadily on, remembering that "tulit alter honores" is the fate of all reformers, and that the welfare of the many can only come from the work and suffering of the few.

As I have hinted in my first chapter, senility, in its most distressing aspects, is not the result of wearing out or of overwork. Men and women who work till they drop rarely get gradual decay; they die suddenly or after a few days' illness. Senility, scientifically speaking, means the cessation of renewal, more than the destruction of existing tissues. Where lies the centre of vital power and what it is we cannot definitely say, but it is almost certain that the chief agents of that power are our ductless glands, and it is their failure that spells senility.

It is perhaps hardly necessary to draw a picture of morbid and premature old age, but

as a warning it may be useful. Firstly, look on the bodily side: the wasting, slackening muscles, the loss of spring and activity, the slow, shuffling walk, the shortness of breath, the pallor and sallowness of the skin, and the vacuity of expression.

The more unseen bodily infirmities it is needless to enumerate. Secondly, look on the still more painful failure of the spirit; the loss of memory for the most important things of the day, the mind dwelling only in the far past, the dulness of perception, and the inability to take in any new ideas; the childish irritability and impatience, unrelieved, as in childhood, by intervals of sanguine hopefulness. Many, men especially, sink into anecdote, and when that anecdote becomes a perpetual encore, they become the worst of bores. To quote Fothergill again on this dismal state: "The prattling child becomes once more the most highly appreciated companion; and the garrulous age loves to pour into uncritical ears long tales of a far by-past time. In habits, thoughts, taste and food, age approaches youth. The process of evolution has given place to a reversed action, or involution. The higher processes, which are slowly developed, and which are to a large extent outcomes of

training and education, gradually fade out and lose their controlling power—the last to develop and the first to go—and the most vivid and enduring impressions of the doting brain are the experiences of its early days, the impressions of childhood."

This is not a cheerful outlook: it is worse, it is humiliating; but surely such an unhappy and untimely ending to our earthly existence cannot be in accordance with the Divine purpose. We see it not in the animal kingdom (except in the overfed, pampered domestic pets who share our vices). The true cause, without doubt, is in our ignorance of the physiological laws of health (laws which the animals seem to know by an instinct which we have lost); in intemperance, in overindulgence, and still more, perhaps, in the great strain of social or business ambitions. Our lives are far too intense and complicated. The mad and ineffectual race for life becomes too often the triumphant race for death.

A thoughtful reader will soon say something like this: "I have known men and women who have lived the most exemplary lives as regards morality and temperance, but whose old age has been clouded and miserable"; and doubtless such is the case, but further inquiries will

show that one or both of the causes are morbid constitutions inherited from erring forebears or an ignorant neglect of the primary laws of health.

Some years ago I knew a man who spent his whole life in philanthropic and religious work, travelling the country, preaching, speaking, and organizing; but in his devotion to his work he entirely neglected his body. He would leave home immediately after breakfast, and return late at night, having taken no food, unless some friend had made him share his meal. At a little over sixty he became first a physical wreck, partially paralyzed; and later his unusually fine religious mind became that of a degraded animal.

The thoughtful regard for the body which has been given us is just as much a duty as the care of the soul. When one looks around and sees these good religious and unselfish souls breaking down prematurely and their lives ending in apparent failure and disease, one is tempted to cry out against the injustice of it all; but God's laws and punishments must not be judged by a few individual cases. These poor sufferers are like those on whom the tower in Siloam fell—not sinners above all men that dwelt in Jerusalem, but they are

guide-posts to show that all God's laws must be obeyed, and not only a chosen few of them.

In face of these degenerative changes which bring about the final tragedy of so many valuable lives, we must not sit still, unhelping and impotent spectators. Such an attitude surely is both unscientific and unworthy of our great profession. And yet how many of us, doctors and laity alike, regard the maladies and diseases of old age as inevitable and unalterable. Modern medicine is disproving these conclusions every day, but we are yet only at the beginning of our knowledge in matters relating to the cause and prevention of decay.

I have used the above words "maladies" and "diseases of old age" purposely, for it is the maladies that are diseases in their infancy, and it is in this early stage that progress may be arrested and in not a few cases a return to normal health be obtained. The functional error precedes, often for a long time, the structural alteration that we call disease, and it is in this stage, of course, that our curative measures will be the more successful.

If we wish, as all of us must do, to further the work of God, the great Creator of all life, and to be with Him a co-worker, we must fix in our minds that His watchword and method

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is progress; not death or destruction. The tragedy, as we call it, of death is a delusion; there is no death and so no tragedy.

Progress will continue after we cease to live here, but to use our earthly life to the best purpose and to prolong it to the uttermost should be our manifest duty and delight. In evolution we see the unfolding of the Divine Will, the power and the beneficent design, all marching, in spite of wars and cataclysms, harmoniously for the good of our race. Evolution, apart from religion, is God's gospel to the world; it is the history of our past, the explanation of our present, and the hope and glory of our future.

**THE TREATMENT AND PREVENTION
OF PREMATURE SENILITY**

CHAPTER IV

THE TREATMENT AND PREVENTION OF PREMATURE SENILITY

FORTY or more years ago surgery, under the influence of Listerism, started a new life, and the world stood astounded at the brilliancy of its achievements. During this time the science of medicine seemed to stand still, but there was much silent good work going on all the time, and for the last twenty years there has been such growth and development as no former period of the world's history has ever seen. Bacteriology, organic chemistry, and the organic remedies chiefly derived from the ductless glands, have revolutionized our methods, and have enormously increased our powers over disease, and perhaps more especially over the diseased conditions peculiar to the elderly and the old.

I think the future of therapeutics lies chiefly in the direction of organic remedies, in the medicines which are more or less native to the human body and not foreign to it. I

should be the last to disparage the value of drugs obtained from plants, such as strychnine, digitalis, aloes, etc., but they are foreigners, and will be gradually superseded, I believe, by those remedies which are more nearly related to the animal organism. Iron, phosphorus, and perhaps arsenic, stand midway; the first two are natural constituents of the body, and should be looked upon as special foods and not as drugs. I make an earnest appeal to my medical brethren to study closely modern physiological therapeutics, and not to be content with the old, so-called orthodox, routine methods. Our watchword, to paraphrase the old French proverb, should be “*Progrès, progrès, toujours progrès et quelquefois l'audace.*”

We can have no “*Quicunque vult*” among our creeds. The past is ours to profit by, but the future is ours to make. In therapeutics we must be optimists, for we carry about in our own bodies most of the remedies we shall need. Many a fall we shall get, but—and this is the chief thing—we must always be found in the saddle again.

I think we may safely say that the natural term of life, since David wrote, has been much prolonged. The term to ordinary healthy folk

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should be nearer ninety years than seventy, and the extra years should not be years of labour and sorrow; and yet what a number fail to reach even the old goal !

Dr. de Havilland Hall, who may be considered one of the first authorities on both arterio-sclerosis and on the life insurance aspect of that disease, says that though the average duration of life has considerably increased during the last fifty years, there has been an actual increase in the mortality-rate among males between the years of forty-five and sixty-five; and that between the ages of fifty-five and sixty-five one-third of the total deaths are due to disease of the heart and bloodvessels. The fearful mortality from cancer, and our powerlessness in face of it, make our hearts ache, but here we have probably a far more frequent cause of death and of incapacity, and we almost ignore it. These statistics are obtained from the Registrar-General's Reports, and are, of course, beyond dispute, but I should roughly estimate that 50 per cent. of the deaths of people over sixty years of age are due to these causes, to Bright's disease, or to the non-tubercular chronic chest diseases that are so often mixed up with them, and many of which belong to

a common origin, and which are not fully or scientifically classified on ordinary death certificates; and to the study of these diseases, then, I ask my readers to accompany me.

The critic, even the friendly critic, will perhaps say, "This is a man with one idea, and he sees one side of the problem only." To a certain extent I admit the justice of this, but I have taken my course deliberately. The other causes of premature and diseased old age, such as the acute febrile diseases, pneumonia and influenza, and all the various forms of malignant disease, are to a large extent outside our control, and compared numerically to arterio-sclerosis are almost negligible. It has been my fortune, good or bad, to hear many sermons and many preachers, and I have been forced to this conclusion, that the ordinary preacher who tries to cover the whole ground, who divides his lengthy sermon into divisions and subdivisions, rarely gets his message home; after a few minutes the drowsy nebulousness of his hearers' minds passes into complete intellectual sleep.

"The braw words rumm'le ower his heid,
Nor steer the sleeper;
And in their restin' graves the deid
Sleep aye the deeper."

STEVENSON.

But the preacher who is content, in a short sermon, to make one or two good points, to touch those points with a little spice or mustard and to ram them home, is the man who fulfils his mission. Such must be my excuse for the limitations of this little book.

How, then, shall we approach this great fight? Most of us are apt to look upon diseases and their beginnings as mere happenings, as the unlucky chances of life, but surely it is not so.

There are some diseases that come from without, as the infectious fevers, against which we cannot entirely guard, but the ordinary diseases are the logical results of a long chain of causes, most of which are under our control. Even the infections from without become diseases only when our powers of resistance are absent or their tide at a low ebb. The first thing we must do, then, is to inquire carefully into causes, into the way of life, and into hereditary tendencies. We must try to remove excessive pressure of bodily or mental work, improper feeding, careless eating and drinking, and we must insure plenty of quiet rest. It goes without saying that to insure any success, we must get our patients' honest and willing co-operation. Without

this we can do but little. Secondly, I would say that every man and woman of fifty years of age should have their hearts and arteries carefully examined. A rise of arterial tension or blood-pressure is almost certainly the earliest symptom that we can detect and rely on in threatening diffuse arterio-sclerosis or thickening of the arteries.

Arterial tension may be described thus: During the resting-time of the heart, between each beat, the circulation of the blood is maintained by the contractile power of the arteries, which steadily urges the blood onward into the capillary vessels and so into the veins. This power is known as arterial tension or pressure, and it is estimated fairly accurately by the sphygmomanometer. A large number of observations have taught us what is the average pressure at different ages of life, and thus we are able to talk about a normal or abnormal pressure. To fix in our minds a clear idea of the physiology of the arterial system I cannot do better than quote Sir Lauder Brunton (*Lancet*, VII. xxvi. 15): "The whole of the arterial system from the aorta down to the smallest arterioles has the power of contraction, but there is much more elasticity and less contractility in the aorta

than in the arterioles, where the contractility is great and the elasticity comparatively slight. The whole system is richly supplied with nerves, some of which, the vaso-motor nerves, induce contraction, while the vaso-dilator nerves have the opposite effect. The arteries have three functions. First, by means of their elasticity, to store up the energy excited by the left ventricle during its systole or contraction, and to expend this again in keeping up the flow of blood during the diastole, when, in the healthy heart, the ventricle is completely shut off from the aorta by the sigmoid valves. The second function is to regulate the flow of blood to those parts which need it, by those vessels which supply the acting organs dilating, while those of the other parts of the body contract. The third function, which is less generally recognized, is to pass the blood on from the arteries into the veins by peristaltic action, an action which causes the arteries to be empty after death." This description may be rather difficult for a lay mind to thoroughly appreciate, but it will at any rate show the main working principle of the circulation. Sir Lauder Brunton again describes arterio-sclerosis thus: "Diffuse or general arterio-sclerosis is a con-

dition in which the walls of the arteries become thickened by a deposit of hyaline tissue between the muscular and endothelial coats. This deposit, which is so liable to occur in kidney disease, is of great importance because a lessening of the lumen or calibre of the arterioles increases the peripheral resistance, leads to hypertrophy of the heart, and thus to an enormous increase of blood-pressure, with consequent danger of rupture of blood-vessels and apoplexy."

With this knowledge in our minds it must be evident that the perfection of physical life depends on the structural perfection and on the physiological well-being of the heart and of the bloodvessels. The blood is not the life and the heart is not the life—the secret of this mystery lies far deeper—but both are life's indispensable ministers.

Hitherto, perhaps, our voyage through life has been a smooth and easy one, possibly too easy: a fair wind has kept our sails comfortably filled; but for many of us, at about a certain age, the weather changes, the wind blows first on one beam, then on the other, or sometimes draws dead ahead, and we have to keep trimming our sails or making wearisome tacks to windward. These signs should be

a warning to us that the voyage is no longer going to be so easy as in the past, and the wiser ones will take careful stock of themselves. It is now that a good physician will be able to give help that is literally invaluable, not so much by medicines as by advice. Let us try and find out for ourselves individually what are the causes of this threatening breakdown and premature decay.

The first cause, but not the most frequent one, is, I think, hereditary gout and an hereditary tendency to Bright's disease, if they can be separated, but both these tendencies can be kept well in check by a wise régime. The second cause, which comes into action far more frequently, is external and is to a large extent preventable or removable. It is the speed, the intensity and high pressure of modern life, and this not only in business and professional men, but in the men and women of society. In the latter class late hours, overfeeding, overdrinking, oversmoking, and continual excitement, are to blame. Among business men anxiety and the excitement of speculation are the chief factors.

We know that among the educated classes at any rate actual drunkenness has very much lessened, but the men and women who lead

these intense lives have more often than not to keep themselves going with some form of stimulant: with small doses of alcohol, the small whisky-and-soda, the liqueur, etc.; others fly to tea or strong coffee and take them to excess. And some, men and women both, are never happy and think they can do nothing without the eternal cigarette, that pernicious form of smoking, in which one never knows when one has had enough.

The still more disastrous effects of morphia and cocaine must be mentioned, but they are outside the scope of this work.

All these things are without doubt temporary helps; as men say, they clear the brain and help them to think more clearly for the time, and to make another spurt. In great moderation and in certain circumstances they are legitimate helps and may carry us through some crisis; but how do they do this? One and all by whipping up the heart and by increasing the rapidity of the circulation, so that more blood is poured through the brain. This, again I say, may be a legitimate action for a reasonable cause and under exceptional circumstances. But if the brain is already tired, this whipping up can only end in still greater fatigue and exhaustion,

and it is thus that a vicious circle of over-excitement, overwork, and over-stimulation is set up. The brain itself no doubt suffers, but not appreciably for some time. What is first evident to the physician is the injury done to the heart and bloodvessels. In a normal state the heart is a very busy organ. It has to contract and dilate about seventy times a minute, and that whether we sleep or wake.

Sir Lauder Brunton, in his "Therapeutics of the Circulation," says: "We are sometimes accustomed to speak of this 'unresting organ,' but this is a total mistake. The heart, in an adult, rests more than thirteen hours out of the twenty-four, the time of rest being the diastole, and the time of work being the systole or contraction. We may say, then, that the heart practically sleeps more than the brain or body; but the great distinction between the sleep of the heart and that of the brain is that the sleep is for so short a time. There are very few healthy men who could not walk a thousand miles in six weeks, walking a little over eight hours a day and resting for the remainder of the period; but there are not many men who can emulate the feat of Captain Barclay, of walking a thousand miles in a

thousand consecutive hours, because the frequent interruptions to their sleep would exhaust them completely.

"In the same way, when the heart is forced to beat more quickly than normal, it becomes more and more quickly exhausted the higher the pulse-rate rises, because nearly the whole time for the extra work is taken from the diastolic pauses, from the resting or sleeping time of the heart."

This extract will clearly show how conservative and careful we should be in the expenditure of the heart's force. Fortunately for us, it is a most long-suffering organ, and has a marvellous power of adjusting itself to meet altered circumstances and strains; and besides this, the natural heart under ordinary conditions is working only at a part of its power and there exists always a considerable reserve of latent force. This varies, of course, in different individuals, and in them under different circumstances. It is this latent force that enables us in health to make unusual and prolonged physical effort, and it is the steady development of this force that gets a man into what we call training and condition. But as we pass our zenith the power of readjustment to varying strains and circumstances,

and also the latent force, become gradually less. A sharp run or a climb that we could do easily at forty-five suddenly, it seems, becomes a big effort that leaves us pumped. No doubt the change has been gradually coming on, but we have not been tested. This change may be in the heart muscle or in the arteries—more often, probably, it begins in the arteries. When these symptoms occur we ought to deeply consider them and profit by them. It is now that we should get our hearts, our arteries, and especially our blood-pressure, tested; now is the chance for our physical salvation. A man may have to reconstruct or rearrange his whole life; this to a busy man is often a very difficult matter, but he must ask himself these questions: Shall I go on as I am doing, do a few more years' work and then die or become a wreck, with a miserable old age? Or shall I pull myself together, get out of my unhealthy ruts, and lead a wise and reformed life, with a reasonable hope of living to a good age, free from paralysis and disease? Many of us, perhaps, shirk such disagreeable questions, put the answer off to another day, or say to ourselves, "As likely as not the doctor is all wrong." But at any rate it is our clear duty

as physicians to put the facts plainly before such patients and to advise them as strongly as we can. The choice of roads rests with them.

To the general practitioner it is a very important thing to keep his patients who are approaching old age in good health and to prolong their lives as far as possible. It should not only be his interest to do this, but also his delight; for one's old patients are often one's best friends. Too many of us get into the way of looking on arterio-sclerosis as incurable and unmanageable, but this is a great mistake. The successful treatment of it is a complicated problem, no doubt, but that should not deter us; it should rather be an attraction to a scientific mind. The writings of some of our best men—Sir Lauder Brunton, Sir Clifford Allbutt, and Dr. George Oliver—have thrown so much light on the subject that there is no longer any excuse for ignorance or apathy on our part.

It is not the hard body worker, as a rule, not the man who lives an outdoor, athletic life, that develops arterio-sclerosis, but the anxious, careworn brain worker, the man who works chiefly indoors and who oftentimes takes his work and his worries home with

him and to bed with him. For such a man there can seldom be any real rest or freedom from the sense of strain. His sleep is rarely the sound, restoring unconsciousness that the body worker gets. The physiological result of such a life must be, in the first place, fatigue, exhaustion, and general impairment of vital energy, but in the second place hypertrophy of the overused parts of the body, and these parts are chiefly the heart and the arteries. The athlete may call on his heart and bloodvessels to do much abnormal work, but it is only for a sudden and a short time, and the intervals of rest are long and sufficient for restoration; but the man I am describing is the bow always bent. "*Nec semper arcum tendit Apollo*" is a proverb he constantly ignores. The activity of his mind is making demands on his circulation night and day, and the vaso-motor nerves that govern the blood-supply to his brain have no rest from toil. The hunting, shooting, golfing outdoor man may and often does lead an injudicious, rather self-indulgent life, eating and drinking more than is necessary, or than is good for him, but he rarely gets sclerosis.

Dr. George Oliver, in his studies on "Blood-Pressure," says: "Nervous anxious tempera-

ments and occupations which involve much anxiety, worry, and nerve strain tend to produce somewhat higher levels of arterial pressure, especially in the latter half of life. On the other hand, placid temperaments and routine occupations—especially of the physical order—dispose to the lower degrees of pressure. I have observed that, as a rule, in subjects in good condition and training, such as athletes, the actual pressure is certainly not raised, and is, indeed, very often below the average normal point, a fact which shows the importance of maintaining the functional activity of the peripheral circulation by exercise. And this conclusion is supported by the observation that in those normal subjects who follow sedentary indoor occupations for many hours daily, the pressure, though generally normal, is more frequently above than below the mean normal pressure line."

Hypertrophy, or overgrowth of muscles that are in special demand, seems to be a physiological law in health, and is a law that makes for efficiency; for instance, the blacksmith's biceps and the boxer's shoulder muscles. If these muscles did not increase and respond to the call made on them, the particular work could not be effectually done;

and so in the diseased condition we call arterio-sclerosis the thickening and increased growth of the heart muscle and of the muscular coats of the arteries is, in the first place, a natural and conservative effort to meet increased demands. But then we come into dealings with another law of nature, which ordains that an abnormally developed muscle is much more prone to degeneration than a normal one. It does not matter if, when his life's work is done, a blacksmith's biceps shrinks and degenerates, but it matters a good deal if our hearts and arteries degenerate. And it is this degeneration and failure that is the essence of the disease I am trying to describe.

Briefly, then, the chain of events is this—overwork, overdemand, overgrowth, which is sufficient and effectual for a time, and then, if the overdemand persists, degeneration and disease.

Biedl, in his work on the internal secretory organs, says: "Every increase in normal activity, whether this be an improved secretion, a strong muscular action, or any other augmented performance, is always associated with an increased disassimilation which is the work of a disassimilatory hormone. But

it must be remembered that in the organism, as elsewhere, no work can be performed without expenditure. So long as the metabolic equilibrium is maintained, every decomposition must inevitably be succeeded by a regeneration. Even in the case of hyperactivity, so long as exhaustion does not supervene, there will be a continual regeneration of the living substance, and therewith a restitution of provision for labour. With the cessation of the disassimilatory stimulus assimilation becomes excessive, and if the process is frequently repeated, the well-known phenomena of organic hypertrophy will make their appearance."

Such is the scientific explanation of hypertrophy. But we see the same laws working in national and political life. The hypertrophy, the overgrowth of militarism run riot; a thing in moderation not bad in itself, which, indeed, will often include and develop such virtues as discipline, self-denial, and patriotism, becomes a great and dangerous evil. Its inevitable consequences, the lust of power, of wealth and conquest, lead surely to a deterioration or degeneration of the whole moral and religious tone of a nation. All God's laws are made for our use. It is little

to our honour that we defeat them by our misuse.

There can be no doubt, I think, that there is a stage—probably lasting for two or three years—of almost constantly but slightly raised arterial tension or pressure before any real sclerosis or thickening takes place, and it is in this stage, of course, that we can do so much for our patients and that patients can do so much for themselves; they should learn how to rearrange their lives and habits and so to avoid the grave symptoms and dangers that must otherwise ensue. Dr. Oliver says on this point: “In diffuse arterio-sclerosis the accessible arteries may not be appreciably thickened, especially in the earlier stages of the disease, and yet the arterial pressure may be raised persistently and definitely. It would seem as if the disease begins more particularly in the terminal divisions of the arterial system—splanchnic and systemic, especially splanchnic. In this stage the peripheral resistance is apparently due mainly to muscular contraction in the arterioles; for these respond readily to vaso-dilator remedies, and the increase of arterial pressure, which is not so high as it subsequently becomes, quickly subsides after each dose. In this hypertonic stage (the

stage of presclerosis described by Houchard) the diastolic pressure rarely rises above 120 mm. and is often only 110 mm., and the systolic pressure does not, as a rule, exceed 160 mm. and is frequently only 145 mm. or 150 mm., and the arteriometer also demonstrates the contraction of the radial calibre and the favourable effect of the treatment in dilating it. But as the disease advances organic changes in the arterial wall develop, when vaso-dilators only partially relieve the pressure, and when they may ultimately fail to lower it at all. In this stage the accessible arteries, such as the brachial become thickened and the arterial pressure rises considerably; the systolic armlet reading advances to such high figures as 200 to 260 mm." We may take it, then, that a small but persistent rise of tension is the first objective symptom that we can discover in threatening sclerosis; the objective heart symptoms belong to a later stage; but there are subjective symptoms that should be a warning, and frequently it is these symptoms that bring the patient for medical help; they are chiefly an increasing shortness of breath on exertion, uncomfortable feelings about the head, such as giddiness and singing in the

ears, especially on stooping, and more particularly, perhaps, a constant sense of fatigue that is quite out of proportion to the work that has been done. This is one type of case, but there is another type that often eludes the physician and deludes the patient. A full-blooded, sanguine man of fifty to sixty has without knowing it persistent high tension; he feels at the top of his form, and lives at the top of his form; his output of energy and work is large and good, and to all appearances his end is not yet; he reminds one rather of the men in the 73rd Psalm who "are in no peril of death, but are lusty and strong; they come into no misfortune like other folk, neither are they plagued like other men." It is an undoubted fact that high arterial pressure in some men leads to increased energy and efficiency, at any rate for a time, but the breakdown comes very suddenly, and their day's work is done. Unconsciously they walk in slippery places, and their precarious foothold on the mountain of life is often only discovered by some accident, such as an attack of gout or an examination for life insurance. If such discovery should be their good-fortune, they may find safety, but only by a revision of their lives, by much self-denial, and by a sensible humility.

As practical physicians, then, our aim must be to get hold of our patients in this pre-sclerotic stage of hypertonus, and to wisely anticipate and prevent the development of the serious organic changes that belong to the later stages of the disease.

Anyone who lives to sixty years without a rise of tension, and who has a sound heart, is likely to live to a full old age, but anyone who between fifty and fifty-five develops raised arterial tension is not likely to live anything like the full span, unless he take himself seriously in hand. His life, his work, and all his habits, must be carefully considered and arranged, and he should certainly place himself under his physician's care. The proverb that says "A man is as old as his arteries" should be considered no longer a proverb, but a working principle.

Hitherto I have considered overwork and over-stimulation, with their inseparable ally, want of rest, as the chief causes of the heart and vascular changes, but there is certainly another and most important agency at work also, and that is the absorption from the stomach and the bowels of poisons, the result of imperfectly digested food.

We all know the serious, even the sometimes

fatal, results of ptomaine-poisoning. That, in a minor degree, is going on all the time with some people, and probably there is also chronic poisoning from morbid bacteria in the intestines or from normal bacteria in excessive numbers. What is known as the bacterial flora of the intestines has a marvellous capacity for extravagant growth. It is all very well for us to blame these wicked microbes "dans le pays bas"; just now they are made to be the universal scapegoats, but it is largely our own habits that are at fault. It is not so much that we are "gluttonous men and winebibbers," but that we eat and drink richer and more stimulating food than we need. And we rarely give ourselves time for perfect digestion. Either from eating too much, or from hurrying away from our food into some new work or excitement, our stomachs seldom get that physiological rest and sleep that is so necessary to perfect digestion. Our whole digestive apparatus becomes a fertile field for poisonous weeds, a seething caldron of discontent. That arterial disease can be produced by this absorption is proved, I think, partly by the results of a reformed diet and life and partly by the results of treatment of the digestive errors. Without any other direct

treatment, we often see the tension come down and the symptoms pass away. Another collateral proof is seen also in chronic bronchial asthma. In this disease after a time there is always a great growth of morbid bacteria in the bronchial tubes—pneumococci, streptococci, or staphylococci—and they, of course, get absorbed into the general system. It is very common to find in this condition arterial tension raised to a considerable degree. If we cure that bronchial affection and destroy the morbid bacteria by a wise vaccine treatment, we shall see the raised tension come down to the normal, and all its other symptoms disappear. I shall go more thoroughly into food questions in the next chapter.

Before approaching the more direct treatment of the disease it will be wise to gain a clear and accurate conception of its arterial condition and pathology, and of the relative importance of the abnormalities one may find. To do this one must study carefully the literature of the subject. I would mention two small and inexpensive books, whose authorship is their own guarantee: "Studies in Blood-Pressure," by Dr. George Oliver (H. K. Lewis), "Therapeutics of the Circulation," by Sir Lauder Brunton (John Murray); and a

newer and larger work is "Diseases of the Arteries," by Sir Clifford Allbutt. From these clear and reliable works the busy practitioner will soon get a good working acquaintance with the subject. The estimation and significance of systolic and diastolic blood-pressure and the use of the sphygmograph and sphygmomanometer are all amply explained. It is hardly necessary to say that the use of the manometer in arterio-sclerosis is absolutely essential.

If a patient come to us in the presclerotic stage, when the tension is raised and when there are the uncomfortable head symptoms that I have before described, but when there are no real organic changes to be discovered in heart or kidneys, what can we do? Firstly, much can be done by comparative rest, by early hours and long nights (the arterial tension after a good night's rest is often 10 mm. below the average day's pressure), by cutting down extremes of work or social pleasures, and by the avoidance of excitement and over-stimulation. A complete rest from business and change of scene when practicable are very useful also. The diet should be plain and simple; red meat should be eaten in great moderation and not more than once

a day. There is, as a rule, no need for an absolute purin-free diet, but it should be in that direction. It will be well, perhaps, to give here the purin contents of foods in grains per pound, pint, or teacup:

Sweetbread ..	70·43	Halibut ..	..	7·14
Liver ..	19·26	Plaice ..	..	5·56
Beef steak ..	14·45	Cod ..	..	4·07
Sirloin ..	9·13	Beans ..	..	4·16
Chicken ..	9·06	Lentils ..	..	4·16
Loin of Pork ..	8·48	Oatmeal ..	..	3·45
Veal ..	8·13	Coffee ..	..	1·70
Ham ..	8·08	Ceylon tea ..	..	1·21
Mutton ..	6·75	China tea ..	..	0·75
Salmon ..	8·15			

(Potts, *Lancet*, 1906, Vol. II., p. 933.)

Perhaps the chief thing is to avoid the flesh extracts, such as beef-tea, strong meat soups, and rich gravies; for this reason boiled or stewed meats are better than fried or roast. This applies to fish and chicken also; a plain grill is good, but the frying-pan is a danger. Vegetable soups made with a bone stock may be taken. Cheese, eggs, and milk should supply the greater part of the nitrogenous food. The better sorts of vegetable foods, such as oatmeal, lentils, peas, and nuts, will all help to take the place of albuminous animal foods. A certain amount of fat should always be taken. A fish and chicken diet contains too little fat, and should

be perfected by bacon, hot or cold. All the farinaceous foods are good, but the more starchy ones, such as sago, rice, and cornflour, are with some people more liable to cause fermentative dyspepsia. Of equal importance as the quality of the food is the quantity. We most of us take more food than we really need, and more than we can easily dispose of. This is especially the case as our strength and vitality lessen; the whipping up of the tired horse helps little towards the journey's end. Coffee is a good stimulant, especially as *café au lait* for breakfast, but strong black coffee taken after lunch or dinner is certainly a raiser of tension. Tea, as far as we know, has not the same effect on the arteries, but taken in excess or too strong may cause an over-worked heart to get irregular and feeble. Good China tea seems to have less of this bad effect than other growths, but is not quite such an effective stimulant. Sugar in moderate quantities, especially cane-sugar, certainly helps the heart to do its work, and is a fuel and especially a muscle food. This is well recognized in the feeding of our soldiers on long marches. With regard to alcohol, one must say that the majority of such patients are better without it, but when a person has

been accustomed to a moderate amount, taken with his food, it does not always do to stop it. Alcohol is not a tension-raiser, as many seem to think, but has rather the opposite action, and if stopped suddenly the power of digestion may be lessened and the whole tone of the body depressed.

So many people in this presclerotic stage have gouty tendencies that strong wines and liquors are certainly unsuitable; a little light wine, such as claret, still Moselle, or Grave, may do no harm if taken with the meals only; the same rule applies also to small quantities of well-matured spirits. Alcohol, wisely chosen and only used as a digestive tonic, may help, but when used as a frequent stimulant to enable the body or mind to do more work, or to increase endurance for pleasure, it certainly does harm. The Americans have a proverb which contains a good deal of truth, "It is not the drinks that do the harm, but the drinks between the drinks."

Sir Lauder Brunton says: "All the alcohols tend to dilate vessels, to lessen blood-pressure, and ultimately to diminish activity of the nervous tissues, although at first they may seem to have a stimulant action." In another place he says: "Alcohol produces dilation of

the peripheral vessels and tends to lower blood-pressure, while at the same time it stimulates the heart." Alcohol contains so little nutritious food (with the exception of the sugars and extractives of wines and beers) that in itself it may be said to give nothing to the body; it only enables a man to draw on his reserves. This may be very useful in emergencies—and of course is so—or when used in great moderation, but unless great care is taken, its inevitable tendency must be to exhaust the reservoirs of nervous energy. The deleterious effect on the other organs when taken in excess is well known, but is outside the scope of this article. This question of the use of alcohol must be argued and handled by physicians on a thoroughly scientific basis. We shall do more for the cause of temperance by sober judgment and advice founded on scientific fact than by hot-headed, prejudiced generalizations. For a wise scientific and temperate article on this subject I would advise my readers to study Sir Lauder Brunton's "Monograph on Alcohol: What it Does and What we Ought to Do with it," issued by The True Temperance Association, Caxton House, Westminster.

The question of tobacco is very often

presented to us, and it is not always an easy one to answer. Nicotine, no doubt, is one of the most powerful raisers of arterial tension known, but in ordinary forms of smoking not very much gets into the system. Tobacco-chewing and snuff-taking—both of which are happily nearly extinct—probably introduce more nicotine into the body than any form of smoking. With cigars the combustion is so complete that very little of the poisonous parts of the plant remains; rather more remains in pipe-smoking. In cigarette-smoking the combustion is nearly as complete as with cigars, but an ordinary cigarette smoker uses much more tobacco in the course of a day than a cigar smoker, for he seldom arrives at the satisfaction point. The habit of inhaling cigarette smoke is, however, the real danger; the absorption of nicotine from the bronchial mucous membrane is very rapid, and much more is absorbed in this way than by those who smoke through the mouth and nose alone. The other chemical products of tobacco combustion, pyridine and the picoline bases, have probably their effects on the vaso-motor nerves also, but their evil influence is chiefly shown by irritation of the mucous membrane of the throat.

Oliver, in his experiments, found that in ordinary people, not excessive smokers, tobacco raises the systolic pressure from 10 to 15 mm., but that it does not raise the diastolic, so that the variation between the two becomes abnormal; this effect soon subsides after smoking is finished—in a quarter of an hour or so.

We all know from experience that excessive smoking often produces very rapid action of the heart, with irregularity and, in some cases, even pretty severe cardiac pain. Nicotine, like many other vegetable poisons, has two actions: first it raises blood-pressure, but after long or excessive use a rebound takes place and the pressure falls far below normal, and so the ultimate effect of excessive smoking is a feeble, low-tension pulse, often irregular.

It is the first pressure-raising effect that clears the brain and helps one, for a time, to think more rapidly and clearly; it is the second that produces the tiredness, the feebleness, and the absence of initiative that we see so often in the man saturated with tobacco. It will readily be seen that a drug which affects the circulation so strongly should be used with great caution and moderation in cases of abnormal or diseased arteries. Tobacco, no doubt, has somewhat of a soothing and quieting effect

on many people with irritable nerves, and to this extent is useful, but one cannot help coming to the conclusion that the average man, with a tendency to arterio-sclerosis, had better give it up entirely; this applies especially to men who lead indoor lives. Moderation in smoking is very rare and difficult to maintain. The man threatened with this disease has to face a serious enemy, and should take no unnecessary chances.

It has been shown that an indoor, sedentary life conduces to high blood-pressure more than an outdoor, active one. It follows, then, that we must try to reform our patients in this matter also; but when we find such a one with his pressure much above the normal, it is very necessary to proceed slowly. Till the tension has been reduced considerably and the heart is able to do its work easily, no violent exercise should be taken. When the heart has to force the blood through tightened, narrowed arteries, it will be readily understood that more force, more *vis a tergo*, has to be used. A mathematician would astonish one if, by his calculations, he showed the great increase of force necessary to pump or force fluid through tubes of diminished calibre. Any great exertion or strain under such circumstances produces weakening

and dilation of the heart itself, and this not only causes much discomfort and inability, but makes the recovery to be slower. Over-strain, with high tension, may cause even a breakage of the valves of the heart themselves, and so the heart becomes a leaky pump as well as an inefficient one. This shows that the treatment of these early cases needs very careful watching. Walking at a moderate pace, on the flat at first, and then up graduated slopes, is the best exercise for most; but they should always stop short of the pumped or out-of-breath stage. Riding on horseback, if the horse is not a puller, is also very good. As the symptoms improve, golf may be allowed, but not on a hilly course, and here the temptation to hurry on to the next hole must be avoided, and also the temptation to lose your temper. People with sclerosis cannot afford to indulge in temper: it is too risky. Cicero says: "Not every sort of temper nor every kind of wine grows sour with age," but, as far as we know, he was not a golfer. Cycling is good if the conditions are good, but riding uphill and against a head wind may very soon become a dangerous strain. In all forms of exercise some distraction or diversion of the mind helps to a better result, and this is in

favour of games such as golf and lawn-tennis. Croquet hardly comes under the head of exercise, but is, I suppose, a diversion. Mountain air is good for such folk, but not at too great an altitude. Above 3,000 or 3,500 feet the alteration of barometric pressure causes shortness of breath, and at still higher altitudes a tendency to haemorrhage. The stimulus of the good air often leads one on to do more than is advisable and so to overstrain the heart. With these guides and reservations in our minds, the fact remains that open air and steady exercise are Nature's way of preventing the degeneration of the body.

The medicinal treatment of this arterial condition, in the first place of high tension and in the second place of sclerosis or thickening, is a subject full of interest and full, also, of hope. Till the last few years we have been almost powerless. That disagreeable drug, iodide of potassium, was almost our only weapon. Its action was very uncertain, especially in the early stage, and many people could not take it on account of its effect on the stomach and of its tendency to cause iodism. The first step in advance was the discovery of the effects of the nitrite group—sodium nitrite,

amyl nitrite, etc. These have a rapid action in lowering tension, and are very useful in emergencies where an immediate effect is desired; but their action is very short-lived, and in some people they cause troublesome headache. Their action in true angina pectoris, especially that of amyl nitrite, is of great value. The comparative freedom from acute pain and the lengthened years of life that such sufferers owe to Lauder Brunton and Murrell form a debt unpayable. Erythrol tetranitrate and mannitol nitrate belong to the same group, but their action is more prolonged. As a groundwork of successful treatment all these remedies cannot be relied upon, for their effect is never permanent. The real hope of successful therapeutics lies in the organic animal remedies.

A few years ago Dr. George Oliver of Harrogate, one of our greatest pioneers in the study of this condition and in the accurate knowledge of all that pertains to the circulation of the blood, brought into notice the good action of the hippurate salts (this is a true animal remedy). They have many great advantages: their action lasts for a long time, they cause no headache and no gastric disturbance, and unless they are pushed too far—to the lower-

ing of the blood-pressure below the normal point—they are not debilitating.

The relief to the heart and brain discomforts of the early days of high blood-pressure is very marked.

Hippuric acid, which can be produced synthetically by treating glycocol with benzoyl chloride, is used in the form of its salts, the chief of which are the lithium, the sodium, and the ammonium hippurate. The ammonium salt is, I think, only half as strong in its action as the other two. It was first used as a solvent of uric acid, but is now chiefly used as a tension depressor. It is interesting to note that it is excreted daily to the extent of about $\frac{1}{2}$ to 1 gramme in man on a mixed diet, but that it may reach 2 to 3 grammes on a vegetarian diet.

The hippurates and benzoates are closely related chemically, and are very similar in their action, but the hippurates are the more easily digested. It is very rarely that 5 to 10 grains daily of one or other of these salts fail to reduce abnormal blood-pressure to the normal point or near it in the early stages, and the relief they give to all the uncomfortable head symptoms and to the feelings of heart distress is very satisfactory. I wish I

could give a scientific explanation of this good effect. I was in communication with Dr. Oliver on the subject, but his untimely death prevented his final report. The lithium salt is perhaps the best where there are symptoms of gout or rheumatism; the ammonium where there is debility.

There is still another class of remedy which I believe to be still more valuable, especially in the later and more confirmed stages of the disease—viz., the extracts of some of the ductless glands, of which thyroid is the chief. We may roughly say that all the gland extracts we have at present are tension depressors, with the exception of the suprarenal and the pituitary, and in the skilful use of these, either singly or in combination, we have most powerful remedies.

The original experiments of Oliver and Schäfer show the effects of the thyroid on arterial tension. These are confirmed by Brunton, who says: "Thyroid gland, when taken by the mouth, dilates the peripheral vessels, makes the skin warm and moist, and quickens the pulse. In this respect it antagonizes the suprarenal secretions. Besides this effect on the blood-pressure, it has other effects on the metabolism, which is important."

Biedl says: "If thyroid extract or iodo-thyrin be given continually for two or three weeks, the amount of carbonic acid excretion will be increased by 15 to 25 per cent. The nitrogenous interchanges are invariably disturbed by thyroid extract; the increased decomposition of albumin is expressed by an increased excretion of nitrogen. (By increasing the caloric food-supply the nitrogen losses may be avoided.) In obesity, owing to the large reserves of fat, the loss of albumin is not so great as in the normal subject.

"Thyroid feeding also brings about a considerable increase of calcium excreted, the calcium carrying off with it a large proportion of phosphorus."

It is very evident, then, that we have in thyroid medication something much more than a mere tension depressor. Its other properties, influencing the excretions, explain to some extent its sphere of usefulness, and also its drawbacks. The increased excretion of calcium may be very helpful in sclerosis, especially, perhaps, when there is atheroma; the loss of phosphorus accounts in some measure for the debility and for the nervous symptoms that often follow its use. The increased excretion of carbonic acid and of nitrogen are

probably helpful, but all these by-effects should be produced slowly and cautiously.

The loss of phosphorus, which shows itself in nervous depression and feebleness, can be met by giving phosphorus in some form, and the best form is, I think, lecithin. I have thought that thyroid treatment in sclerosis is more satisfactory in the cases where there is no serious kidney complication; this seems reasonable, for in Bright's disease the kidneys would only imperfectly carry off the results of increased nitrogen metabolism, and this failure of excretion would leave the blood overcharged with these products. In thyroid treatment we must stop short, as far as possible, of producing its disagreeable effects—palpitation of the heart, giddiness, and their accompanying distress; the sphygmomanometer should here be our guide. If the tension fall to normal or below, and the above symptoms appear, a 5-grain tablet of suprarenal extract once or twice a day will soon relieve them. This sounds like an illogical proceeding when you are trying to lower pressure, but in practice it succeeds well. It is a well-known fact that in health thyroid feeding increases the amount of adrenine (the suprarenal secretion) in the blood; this is

probably a wise compensation, and one can readily understand how, in diseased conditions, this compensation may fail to take place.

In using these natural gland extracts as medicines, we must not lose sight of those important properties which enable them to act as hormones (stimulants) or chalones (inhibitors) to the other glands; and in imitating Nature we shall get the best results.

Though in obesity thyroid often causes loss of weight, in thin people who show signs of hypothyroidism it often has the opposite effect. In thyroid treatment, especially as old age draws near, we have before us a most interesting field of study, full of possibilities and hope.

For many years iodide of potash has had a great reputation in the treatment of arteriosclerosis, a reputation far beyond its deserts; but it apparently does some good in certain cases. As far as experiments go, it has no direct effect in lowering blood-pressure. It almost certainly acts, as all preparations of iodine do, by stimulating and increasing the output of thyroid secretion. Rendle Short says: "An increased thyroid secretion may be obtained by giving iodides. There we find the explanation, so long sought in vain, of the

effects of iodides on gummata, arterio-sclerosis, and aneurism. The beneficial agent is really the increased internal secretion of the thyroid gland. Two important results of observation and experiment confirm this theory. In the first place, in cases of myxoedema, arterio-sclerosis is early and intense, and the same is true in animals after removal of the thyroid.

"Eiselberg gives a number of very convincing photographs of intense atheroma in the aorta in his cretin lambs from which the thyroid has been removed. In the second place, thyroid extract has a wonderful power over young connective tissue, as is seen by the way in which it absorbs the subcutaneous thickening of myxoedema and cretinism.

"It is not surprising, therefore, that it should be able to deal also with gummata and atheroma."

This question of thyroid treatment is so intimately connected with the symptoms of senile degeneration and with its preceding years that one is compelled to give it the greatest consideration.

At the risk of wearying my readers, I must give them the general conclusions arrived at by those eminent men Biedl and Eppinger.

(My readers can, if they like, skip the scientific arguments and try to grasp the lessons that are taught.)

"The thyroid and the suprarenal system, together with the infundibular portion of the pituitary, constitute a group of vascular glands which augment and accelerate the processes of metabolism. The balance is maintained by the antagonistic activity of those other vascular glands, like the pancreas and the parathyroids, which exercise a restraining influence upon metabolism. These two groups of internal secretory glands possess physiological interrelationship with one another. The extirpation of a vascular gland is followed by differing sets of phenomena: firstly, there are the direct results due to the suppression of the specific secretion; secondly, there are the indirect results due to derangement of the other glands, the functions of which, under normal conditions, were either stimulated or inhibited by the secretion of the removed gland.

"The thyroid is believed to promote the activity of the suprarenal or chromaffin system and to inhibit that of the pancreas. The direct results of the removal of the thyroid consist in reduction of the metabolism of

albumin, fat, and salts; the indirect results are, on the one hand, the absence of stimulation of the chromaffin system, and on the other a hyperactivity of the pancreas, due to the removal of the inhibitory agent.

"It is believed that the nervous system is the agent by which the interactivities of the vascular glands are affected. That group of them which promotes metabolism has a sympathetic innervation and stimulates the sympathetic nerves, at the same time exercising an inhibitory effect upon the autonomous nerves. The group which retards metabolism, on the other hand, possesses an autonomous innervation, and, while stimulating the autonomous, inhibit the sympathetic.

"The thyroid possesses a double function, being furnished with both classes of nerves, and is thus able to affect both divisions of the nervous system."

It will thus be seen what an important position the thyroid holds in our economy, and what enormous hints for treatment of morbid conditions and for the explanation of them, the study of this subject suggests. The great abdominal sympathetic ganglion has been called the Clapham Junction of the nervous system; in like manner the thyroid seems to be

the principal centre of the system that receives and transmits the hormonic or chalonic messages which, passing from gland to gland, stimulate and control the problems of growth and nutrition in our bodies.

The results of total removal of the gland described above have been obtained partly from experiments on animals and partly from those cases in human beings where the gland has had to be removed for some growth in the gland itself. It is a well-known, ascertained fact that removal of the thyroid in man produces the disease called myxœdema. This organ, like many others, has a surplus of power in health, so that extraordinary demands can be met. This is shown by the experience of surgeons that if a quarter of the gland be left the symptoms of myxœdema will not show themselves.

This wonderful machine that we call our body differs from a man-made machine in its wonderful elasticity and reserves of force. If we could only devise spare parts to add to the spare force, we could enter into a race with Methuselah. In the great majority of cases of premature senility, accompanied by the early symptoms of sclerosis, raised blood-pressure, etc., we shall find many of the signs

that belong to that form of myxoedema that we see after total removal of the thyroid. Here thyroid administration will give good results, but in those cases of subthyroidism where there is subnormal pressure we often find a very poor state of the venous circulation —cold and blue hands and feet, and chilblains often. The vitality is low. In such cases much benefit is obtained from the addition of suprarenal extract to the thyroid, and by giving good doses of calcium salts. With regard to the importance of these calcium salts, Rendle Short says: "It has long been recognized that they are essential to the continued success of perfusion fluids, and now we know that they control the coagulation and viscosity of the blood, and probably the functions of the ovary and parathyroid glands also." Remarkably good results have been obtained by giving 15 grains of calcium lactate in solution three times a day before food for three days consecutively, and by occasionally repeating the process.

As we pass on to real old age we often find the symptoms of thyroid deficiency still more marked and of much graver import. We are only beginning to realize how much senility depends on internal gland insufficiency. Biedl

says: "A special pathogenetic significance is ascribed to thyroid insufficiency in the changes which occur in later life, and which are included in the term 'senile degeneration.' The foundation for the theory that old age results from changes in the thyroid lies in the fact that in old age this gland becomes atrophied, its follicles shrink, and retrogressive changes take place in the epithelial cells. This is reinforced by the fact that there is a profound analogy between the signs of advanced old age and those of myxœdema. The falling of the hair and the dropping out of the teeth, the dry and wrinkled skin, the lowered body temperature, the diminished perspiration, the indolent digestion and consequent emaciation, the reduced metabolism, the decrease of mental power, and the diminished activity of the whole nervous system —these are all symptoms which characterize chronic myxœdema."

The late Sir Victor Horsley held the view that "Senility is due, at any rate in part, to thyroid degeneration, while myxœdema may be described as a condition of premature senility."

The following case is an illustration of my argument: "A man aged eighty years, who

for some time had shown the early signs of brain degeneration, suddenly, after some extra fatigue, collapsed. He was almost unconscious and lay prostrate on his back. For days he could hardly swallow, the power over both sphincters was completely in abeyance, bedsores formed, and he seemed to be a hopeless dying case; yet there was no aphasia and no true paralysis; he could just move every limb if pressed to do so; reflexes were present, but feeble. Arterial tension was 165 mm. As a forlorn hope I gave him thyroid extract, 5 grains of fresh gland daily. He at once began to improve; in a fortnight all incontinence was gone; he could swallow well, and the bedsores healed. After three months' continuous thyroid treatment, he could walk two miles a day, his tension was 140 mm., and his mental condition was somewhat improved. No other medicinal treatment was given, and I think thyroid may fairly claim the honour of the results." (This man lived for eighteen months after the attack described.)

In many cases of bladder weakness in old age and in both sexes where there is partial incontinence, the careful use of thyroid will often give good results. In old men with enlarged prostates we see no rapid effects,

but there is accumulating evidence to show that thyroid feeding controls and lessens the growth of the gland, and so in time relief may come. When one considers how much the thyroid and parathyroid glands are concerned with calcium metabolism, one must realize how much assistance they may give in the circulatory troubles of thyroid disturbance; and is it not reasonable to think that this increased metabolism and excretion of calcium may have some beneficial effect on the atheromatous deposits that in the later stages of sclerosis so often occur in the arteries, and which are probably the site and cause of cerebral haemorrhage? If the depressing effects of thyroid feeding are too great, there is no need for alarm; they soon pass off, and the treatment can be continued with lesser doses or with some compensating help. In treating a case of high blood-pressure, it is very necessary to estimate carefully the condition of the heart. We may find no murmurs, but we shall often find dilatation, the heart's apex-beat in the nipple line or outside it. If this is so, it is very important to brace up the heart's muscle at the same time as we lower the peripheral resistance, otherwise the heart's muscular action may

become irregular and disturbed; it has been timed to work against a certain resistance, and it does not quickly tune its timing apparatus to fit the new circumstances. Strophanthus, I think, is the best vegetable medicine for this purpose, as it has no effect on the blood-pressure in the smaller arteries; it should be given in full doses. Spartein sulphate also does fairly well. In a few cases digitalis may be necessary, but it should be given for a very few days. There is much variance of opinion as to whether digitalis increases arterial blood-pressure or not, but from many observations I feel pretty sure that it does so when the arteries are diseased. I have come across many cases where this drug has been given to meet the heart symptoms of arterio-sclerosis and where the symptoms have become steadily worse. Sodium nitrite or a good dose of hippurate given at the same time will help much, but there are few cases that will not answer to strophanthus.

This question as to the action of digitalis on the arterioles, and consequently on blood-pressure, is a very important one, and should be definitely decided by experimenting physiologists. Mackenzie, in his experiments at the Mount Vernon Hospital, has come to the

conclusion that it does not often raise pressure, and Dr. F. W. Price confirms this view. On the other side Brunton says: "It is now generally recognized that digitalis has (1) the power of slowing the heart, (2) of making it stronger, (3) of contracting the vessels." Later on he says: "Digitalis acts on the cardiac muscle, the intrinsic cardiac nerve, and the vagus centre in the medulla. It also affects the arterioles, causing them to contract; and probably it has upon them also a twofold action, as on the heart, stimulating both the contractile muscular walls and the nerves which go with them." Sir William Whitla, a very careful observer, says: "Its action upon the arterioles must always be remembered, for by increasing peripheral resistance it raises the renal and general blood-pressure." Clifford Allbutt, "Dictionary of Medicine," vol. v., p. 961, says: "Tone we may define as that property in heart, artery, or other hollow viscus, which preserves the mean diameter of the part; contraction as that which enables the organ, nevertheless, to obey stimulus and to perform particular acts. The vermicular movements of the bowel and of an arteriole are due to the quality of contractibility; their tone preserves their mean diameter in spite

of distension or contraction. Were it not for tone a hollow organ, often subject to extravagant demands, would be strained and perhaps ruptured. In the heart it is tone which does much, if not all, to prevent loss of form under the great variations of internal pressure." Farther on he says: "Digitalis produces a distinct increase of tone, which may be pushed to a degree inconsistent with normal function." Again he says: "Tone, then, is the quality to be watched and supported, and in digitalis we have a means of intensifying tone and of moderating distensibility. Now tone, like any other quality in excess, may be injurious, and the output of the constricted ventricle may fall short of the demands of the system. Again, when the muscle falls into degeneration digitalis seems to have other injurious actions, the nature of which is obscure."

May we not extend this argument from the heart muscle to the arterial muscular coats? And will not careful observation of arterial pressure be the guide to the use of this powerful remedy? If we give enough digitalis to render perfect the tone of the ventricle and not to pass beyond that point, we shall probably be doing the same for the musculature

of the arterioles, and thereby improve the general condition of the circulation and also the nutrition of the arterial coats themselves. But if we press beyond this normal tone-point, it is easily seen that we increase peripheral resistance and so embarrass and add to the work of the heart. In arterio-sclerosis, I think, we often get signs of arterial degeneration before the heart muscle is affected, and it may be in those cases that digitalis is especially harmful.

I have gone rather fully into this question, as I have so often seen this most valuable drug misused, and by misuse do harm. Neither men nor medicines should lose their reputations by being used in the wrong way and in the wrong place.

A most useful way of giving digitalis is the old St. George's Hospital pill composed of blue pill, squills, and digitalis:

B. Pil. hydrarg.	..	..	..	gr. 1
Pulv. digitalis	..	..	..	gr. 1½
Pil. scillæ co.	..	..	..	gr. 2
Ft. pil. T.d.s.				

Here the mercury, which is one of the most powerful tension depressors we have, counteracts the effect of the digitalis on the arteries; it at the same time helps the liver to unload,

while the squills act as a diuretic and as a heart tonic also. It is no exaggeration to say that this happy combination has pulled many a failing heart back into safety. A dose of calomel or blue pill once a week is a very good rule for this disease. Whether it acts by unloading the liver or by its bactericidal power in the intestines, or by both, I know not; but the result is undoubtedly good.

In treating the blood-pressure with thyroid, some heart tonic is often required. The manufacturing chemists of England and America have lately introduced some very good combinations of internal gland extracts. The English preparations, so far as I know, have all got pituitary or suprarenal in them, and this renders them unsuitable for most cases of sclerosis; they are excellent nerve and body tonics, but they all tend to raise pressure. Carnick and Company of New York have placed on the market a most useful tablet which they call "Hormotone." There are two preparations, one with pituitary and one without; the latter, of course, is for use in sclerosis and in high blood-pressure; it is one of the most valuable preparations that I have used for reducing tension. It causes no

headache and little or no cardiac depression. It is composed of thyroid, ovary, and testis. The stimulating effects of the ovary and testis extracts, both on the nervous system and on metabolism, seem to help the good effect of the thyroid and to counterbalance its depressing effect on the heart. I hope some of our big manufacturing chemists will place such a tablet on our market before long. In my experience better effects are obtained by this combination than by thyroid alone. In January, 1917, Carnrick and Company put on our market another hormotone, which has the addition of an extract of the anterior portion of the pituitary gland. As far as I can at present judge this is a distinct improvement in some cases, in the treatment of high blood-pressure.

A most interesting problem for solution has been opened in Italy by Dr. Marabotto. With intravenous injections of a watery extract of suprarenal, he has produced decided atheroma in the aorta of rabbits (no such effect was produced by subcutaneous or oral administration). The removal of the thyroid or great thyroid deficiency is known to cause atheroma also. Is this result due merely to absence of thyroid secretion? Or is it due to

the suprarenal secretion losing its natural counterweight and so acting on the arterial system unchecked? Thyroid is supposed, and rightly, I think, to be an activator or hormone to the chromaffin glands, of which suprarenal is one of the most important. It looks as if it were at the same time an activator and an antidote, or at any rate a check. An interesting complement to this experiment of Marabotto's would be to give full thyroid feeding to the rabbits while under this suprarenal treatment.

Dr. Marabotto's further experiments and results with a suprarenal toxic serum are full of interest and hope from the therapeutic point of view, and his final results may turn out to be most important.

There is a temptation to take narrow views about the properties of all the internal secretion glands. We think of thyroid as a tension depressor and of suprarenal and pituitary as tension raisers, and to a certain point we are right. We gain our immediate object, at any rate, when we administer one or other of them by the mouth or by subcutaneous injection, but when one thinks of all these glands of the animal economy working simultaneously, and in health harmoniously, and of all

of them linked up together by a sort of wireless telegraphy, the problem becomes much more intricate. We may use gland extracts such as thyroid or suprarenal for one definite action and purpose, but we must not forget that their influence may spread far beyond our original plan.

The thoughtful study of the physiological and therapeutic properties of all these internal glands seems to me to be of the utmost importance; they are Nature's own remedies; they are the chief weapons with which she meets all emergencies, not only of disease, but of abnormal external circumstances. Take, for example, the case of suprarenal extract. Dr. George Murray, in his article in the *Practitioner* of February, 1915, says: "It has been clearly shown that under the influence of a strong stimulus, such as fright, adrenaline is rapidly discharged into the adrenal veins and so into the general circulation. It is interesting to follow up the effects of this condition of adrenalæmia and to see how useful they may be to an animal either in contending with or in escaping from the cause of fear. The excess of adrenaline dilates the coronary arteries, gives the heart a larger supply of blood, increases the strength of the

cardiac contractions, and raises the blood-pressure. It tends to divert the chief flow of blood from the abdominal vessels to those of the central nervous system, heart, lungs, and muscles. The adrenine thus stimulates just those activities which an animal employs either in fighting a foe or in escaping from an enemy. In addition to this, the adrenine mobilizes the store of glycogen in the liver, thus increasing the amount of sugar in the blood and rendering it available for use in the muscular action entailed in effort."

With the leucocytes of the blood, they stand at the door and guard against the entry of the poisonous bacteria from without. An everyday proof of this is the increased liability to tuberculosis and the other bacterial invasions that we find in Addison's disease and in cretinism, these being examples of suprarenal and thyroid deficiency respectively.

These glands are like the keyboard of an organ, by the trained and skilful use of which we can produce effects fortissimo and pianissimo, by which we can produce harmonies and discords, and by which we can resolve the discords of disease into the harmonies of health. The study of these internal glands only belongs to the recent years, and one may ques-

tion whether our knowledge or our ignorance of them would weigh down the balance, but I think we know enough to see in part their great value and to have the assurance that patient and honest use and investigation will largely increase that value.

It is not alone in morbid abnormal conditions that these glands are of such value, but, as Brown-Séquard thought and experienced, they can maintain the vitality and activity both of body and mind in advancing years, and this they do, not by artificial temporary stimulation, but by supplying from without the life and power giving secretions, whose supply is failing within. For this work the best gland extracts are, I think, those of the ovary, testis, and thyroid; with them should be combined infundibulin or pitglandin (the former coming from the posterior portion of the pituitary and the latter from the anterior); a supernormal or subnormal blood-pressure will indicate the right combination, but I have no doubt that a wise combination acts better than any single gland. In extreme old age, when blood-pressure naturally falls, suprarenal extract may also be of great value. The value of pitglandin is as yet hardly recognized. I ask my confrères who are getting old and

tired to try this treatment on themselves, for I feel sure that their strength and the value of their work will increase.

There has been some confusion and doubt as to dosage, caused by some writers using the fresh gland and some the dried extract; it will, I think, be a help if I give the following relations, which are approximately correct:

British Pharmacopæia.

1 grain of dried thyroid = $3\frac{1}{2}$ parts of fresh gland.

Armour's Dried Powder.

1 grain dried orchitic	= 7 grains fresh gland
1 grain dried ovarian	= 7 grains fresh gland
1 grain dried pituitary	= 4 grains fresh gland
1 grain dried suprarenal	= 6 grains fresh gland

It will be well in prescribing to use the dried extract as far as possible, but most of our English makers have issued tablets containing 5 grains or $2\frac{1}{2}$ grains of fresh gland; this especially applies to the thyroid and suprarenals. Carnrick's Hormotones without pituitary contain only $\frac{1}{10}$ grain of dried thyroid extract, and from three to six tablets are taken daily. The larger dose (6 tablets) would represent $\frac{3}{5}$ grain of dried thyroid a day, whereas one of our English 5-grain tablets would contain about $1\frac{1}{4}$ grains. Most people cannot take so much as this, $1\frac{1}{4}$ grains daily, without

showing some of the depressing effects of the remedy. A very good formula for a combined tablet for use in sclerosis as a tension depressor is :

Dried thyroid ..	..	..	gr. $\frac{1}{4}$
Dried orchitic ..	..	..	gr. $\frac{1}{3}$
Dried ovarian ..	..	..	gr. $\frac{1}{3}$

This is about double the strength of Carnrick's Hormotones, and consequently two or three daily would be an efficient dose. These are made and supplied by S. Hardwick, Poole Hill, Bournemouth.

The original hormtone, which contains pituitary, is a very good tonic, but generally raises pressure. As I have said before, suprarenal extract may safely be used as a counter-balance to thyroid, especially in quite old people. Suprarenal is the most useful tonic we at present possess in the physical weakness of extreme old age, and may be used fearlessly; combined with phosphorus (especially in the form of lecithin) as a brain food it often gives astonishing results.

There are other gland extracts, such as thymus, pancreas, etc., which are used with success in other morbid conditions, but this is not the place for their consideration. The whole subject is so full of interest that one knows not where to stop, but if one let oneself go

the chief points of one's sermon would run a risk of being overwhelmed under the boredom of the unhappy reader.

The condition of the blood itself I have not yet mentioned, but it is an important consideration. There can be no doubt that the viscosity or thickness of the blood fluid varies, and it must be evident that increased viscosity means a call for increased driving power from the heart. This is a subject which has not been fully worked out. Many people drink far too little fluid even in health; half a pint or a little more for breakfast, half a pint or less for lunch, half a pint for tea, and half a pint for dinner, is nearly the usual custom, and this represents about 30 ounces of fluid daily. There is some more taken, of course, in the food, but the total is not enough. Another pint taken between or before meals would generally be beneficial, and would tend to thin the blood. There seems to be little doubt that oxygen lessens the viscosity of the blood. Sir Lauder Brunton has found that in bleeding from a vein, the inhalation of oxygen will cause blood too thick to flow to come readily, and I can corroborate his experience. Probably with a sedentary indoor life the viscosity of the blood increases. This points the lesson that everyone with this

tendency should live and sleep as much as possible in good pure air, and that he should take what outdoor exercise he can. Well-regulated exercise spreads the circulation of the blood over a much larger area; in rest the blood to a large extent collects in our internal reservoirs and becomes partially stagnant, but exercise sends it coursing through all the arteries and veins of our limbs, and thus internal congestion and viscosity are simultaneously relieved.

Here I must emphasize the great value of bleeding in cases of very high tension, especially where there is evidence of congestion in the brain (this is generally marked by a feeling of fulness and pain at the back of the head and neck), and also in those cases where there is much difficulty in breathing. Owing to the embarrassed state of the heart and circulation generally, we see, not infrequently, sudden attacks of engorgement of the lungs, causing great dyspnoea and the expectoration of blood-stained, frothy mucus, the face and lips becoming blue. Here bleeding acts like a charm; as the blood flows, all the distress quietly but quickly subsides. In such cases bleeding from the arm veins is no doubt the wisest method, but in the head cases, I think, we get better results by applying leeches to

the back of the neck; the blood should be encouraged to flow quietly for an hour or so after the leeches have fallen off. If the pain is in front, the leeches can be put on the temples. Any faintness that may arise is quickly relieved by a hypodermic injection of strychnine. The good that results is no doubt due, not to the mere emptying of the bloodvessels, but to the alteration of the quality of the blood; for as soon as the vessels are partially emptied, they fill up again, by extracting the watery constituents of the tissues, and thus the viscosity of the blood is reduced.

In dieting patients with arterio-sclerosis, we should be careful not to give them food that contains too much calcium; in ordering them to give up meat we often err by giving them too much milk. We should bear in mind that coagulability of the blood is increased by carbonic acid, calcium, magnesia, and milk, and diminished by oxygen, alcohol, diminution of lime salts, and by the fruit acids; the effects of carbonic acid and oxygen in this relation strengthen the argument for a non-sedentary, open-air life. Sir James Barr says that "fixed lime (in the albumin molecule) increases viscosity and coagulability, while the free calcium ions, in association with the suprarenal and pituitary secre-

tions, increase the tone and contraction of the arteries and arterioles, heighten blood-pressure, and maintain force and efficiency of the cardiac contractions." The popular view that milk in quantity is a wholesome food for adults in all circumstances is thus shown to be wrong. It points also to the great value of fruit in the diet of old people; even the much-abused rhubarb, though injurious in some ways, lessens the viscosity of the blood. The thoughtful man will see that in this disease a wide and philosophical view must be taken of the whole subject. The heart, the bloodvessels, the circulating fluid, the vaso-motor nervous system, and the whole method of life, have to be taken into careful consideration.

There remain in the treatment of this disease the questions of balneology and electricity. The Nauheim treatment, whether carried out there or in England, acts, perhaps, as much by reducing arterial tension and peripheral resistance as by any direct action on the dilated heart; the immediate effect of the bath is to produce great dilatation of the surface arterioles and capillaries of the skin—in fact, cutaneous hyperæmia of a most active kind; this naturally lessens the amount of blood in the internal reservoirs, and enables the heart to do its work with more ease and

less resistance. In the *Practitioner* of August, 1912, is a clear and instructive article by Dr. Thorne on the effect of Nauheim treatment on arterio-sclerosis when carried out at home. Other natural waters, such as those of Llangam-march Wells in Wales, can be used, but the imitations with ordinary waters, or especially with sea-water, seem to have nearly as good results. Judicious hydropathic treatment may often give help in many ways. In the early stages of the disease the high-frequency electrical treatment is often successful as an aid to other methods, and its action is more than a passing one. In the later stages it is not of much use in my experience, but in these the Bergonié Faradic method seems very promising, especially, perhaps, where there is obesity. It is, perhaps, hardly necessary to say that these treatments must be carried out by physicians who have made a study of electricity, and who know its risks and its limitations.

I will now endeavour to condense the foregoing theories and facts into a more practical shape. We may roughly divide the cases of arterio-sclerosis into three divisions; the first in which there is only raised blood-pressure, and that not constant, in which there is no sign of kidney disease nor of palpable arterial

thickening; in this stage we often find a tendency to heart dilatation, but it is often only evident after exertion. This class occurs very frequently in women about fifty, and should be treated quickly and thoroughly; for now it is easily cured, but if neglected may drift on insidiously into real disease. This condition one finds also in men, but generally earlier in life; about forty-five to fifty the anxious, overworked man or the intemperate may show the first symptoms. In both sexes 5 or 6 grains daily of hippurate, with some strophanthus, will bring the tension down to normal, but to get a permanent result the treatment must be continued in lessening doses for some months. It is well to take such patients fully into one's confidence, and to explain the treatment and the dangers of neglect. If on careful examination one finds signs of subthyroidism, one may bring down the tension with thyroid or, better still, with the compound tablet I have mentioned—Carnrick's without pituitary. In using either of these the weight should be watched—naturally stout people stand them better than the thin; with this gland treatment the heart may require toning up also. The rules for diet, rest, and exercise must, of course, be

given. These and the next class are they that run about the world seeking for some new nerve tonic or some new stimulant, and that spend their money on something that is worse than vain, for they know not their own disease.

In the second class the symptoms are much the same, but more constant; the blood-pressure yields with difficulty to treatment, or cannot be brought below 150 to 160 mm. The heart is generally permanently, though slightly, enlarged, and there are early signs of kidney troubles. Women in this stage are often unhappy and depressed, but men are often brimming over with a sort of false energy; in both there is generally shortness of breath on exertion. The treatment is much the same as in the first class, but will need more perseverance and watching, and no real cure can be expected. The evil day may, however, be long postponed. In both these classes the electrical and the bath treatments mentioned before are often of much help.

In the third class, where there is distinct heart and kidney disease, and especially where there is atheroma, one must proceed very cautiously. In these there is no normal point of tension. One must find out in each case the point at which the patient feels most

comfortable and capable. One will live fairly easily at a pressure of 165 to 175 mm., and will be good for nothing at 145 mm. Nature, as she usually does in abnormal circumstances when left to herself, has established a fair working equilibrium which should not be roughly disturbed. The extreme degrees of tension, such as 200 mm. or over, should certainly be attacked, but should be brought down very gradually. These patients, if they lead careful and abstemious lives, may still live to real old age, but they cannot afford to run any risks nor to make exceptions to their self-denying ordinances. After eighty the tendency to progressive sclerosis generally ceases, the arteries become softer, and the circulatory stress relaxes.

The chief danger in this third class is atheroma, specially when it occurs in the aorta or in the cerebral arteries. In such cases we may not find much pressure—sometimes, indeed, it may be below normal; these will often need cardiac tonics. Thyroid or the combined glands with pituitary should be carefully given and watched. If there is advanced kidney disease, thyroid may do harm; the results of increased metabolism which it causes may have no sufficient outlet, and the system becomes overcharged with

effete materials. In the second and third classes it is very necessary to keep the liver acting freely; occasional doses of blue pill or calomel at night, with sulphate of soda in the morning, are most beneficial, and, by relieving the portal circulation, lower the general blood-pressure and ease the work of the heart.

These three classes have, of course, no clear lines of subdivision, and may merge into each other almost insensibly, but they form a fairly accurate guide to prognosis and treatment.

When all has been said about the treatment of this morbid condition we call arteriosclerosis, we are sure to be faced with a somewhat sceptical criticism. One will ask, "Is not this thickening of the arterial coats with the increase of tension Nature's method of keeping up a failing circulation?" And one must honestly answer, "Yes." The same criticism would apply equally to the case of hypertrophy of the heart, which grows stronger and bigger only to meet an increased and unnatural demand: yet no one would hesitate to treat and rest such a heart. The sclerosis is a fault to compensate in a measure for another fault; but if one can remove or partially cure the original and causative error, one surely may and should treat and cure,

if possible, the resulting error. It cannot be our pharisaical duty to stand by and see the vicious circle of disease go on to its end unbroken. The original causes of the disease, except in those unhappy cases in which the tendency is inherited, are largely removable, for mostly they arise from physiological law-breaking and from nervous overstrain. Let us, then, throw aside this weight of paralyzing hypercriticism, a sin that doth so easily beset us, and let us march fearlessly but cautiously on in the path of restoration and of healing. After all our arguments and speculations, the court of appeal that has to pronounce judgment is formed by our patients themselves. Ask any man or woman who has suffered from the miseries and discomforts of arterio-sclerosis, when accompanied by high blood-pressure, how they feel after that pressure has been carefully and judiciously reduced, and you will get no uncertain answer. They can work and think far better, their breathing is easier, and they lose the cardiac and the brain discomforts that have made their lives so miserable. Their sleep becomes again quiet and refreshing; and beyond the improvement in these subjective symptoms, there is a condition of far better general health, and, what is perhaps equally important,

of greater safety. It must be evident that anyone attempting to lead a strenuous life in mental or bodily work, with a pressure much above the normal, is in daily danger of a bad breakdown, of one that will practically end his working days. It should, therefore, be our manifest duty to bring all such to the knowledge of their danger, to persuade them to lead a new life and to grasp the means of safety that we can offer them. During the last few years it has been the fortunate lot of many of us to be able, with our sclerotic patients, to steer them safely through the dangerous years and shoals of later middle life into the quiet and restful harbour of real old age, free from paralysis and with mind unclouded.

NOTE.—Since the above chapter was written the experience of others and myself with Pitglandin (the extract of the pars anterior) has extended, and has shown its great value.

This is not to be wondered at, when one considers the influence on growth and development exercised by this part of the pituitary gland.

It is practically non-poisonous, and can be given in large doses—up to 30 grains daily of the fresh extract. It acts as a tonic to the whole nervous system, and yet tends to lower blood-pressure ; it is therefore very valuable in the debility of old age, and can be combined with thyroid and suprarenal if necessary.

**CHRONIC BRONCHITIS AND
BRONCHIAL ASTHMA**

CHAPTER V

CHRONIC BRONCHITIS AND BRONCHIAL ASTHMA : ITS SCIENTIFIC AND RATIONAL CURE

The Microbe's "Apologia pro vita mea."

"Blindly we seem to labour,
Whether for good or for ill,
But God, all-seeing, Who made us,
Knows we are working His will.

"Patient unceasing toilers
In the welter of growth and decay,
We further the infinite purpose
Of His wondrous alchemy."

In this chapter I propose to discuss the origin and treatment of that form of chronic bronchitis, often connected with asthma, that so cripples and shortens the lives of elderly people. The disease called pure spasmodic asthma, which may begin without bronchitis, belongs almost entirely to earlier years and does not come within the scope of this article, though the vaccine treatment that I am going to describe will often cure it. Especially in large towns with impure smoky atmosphere this disease among the elderly gives us a large

part of our work, and often much worry and disappointment; but that is of little consequence compared with the wretched health and the premature deaths that it causes among our patients, and among the working classes the shortening of the working years that it entails is a matter of serious moment both to the individual and to the nation.

The original causes are not always the same. It may begin by frequent attacks of simple head catarrh, which gradually extend to the bronchial mucous membrane; it may begin with influenza; it may arise from slight attacks of pneumonia or of broncho-pneumonia, which are often unrecognized and untreated; or it may be caused by continued inhalation of irritant gases or particles that belong to their trade. Among men and women who have to live and work in such unhealthy surroundings we have to fight this disease chiefly in its own lair—change of air and work are rarely possible—and this is a fight which needs all the weapons that modern science can give us, all our patience and all our skill; but when one weighs up the results it is a fight worth the fighting.

Whatever the original cause of the condition may be, we find that sooner or later, in almost

every case, we have a microbic infection to deal with. It is very rarely that one finds the sputum sterile. The microbes that we find are chiefly—and I am trying to give them in the order of their frequency—the Micrococcus catarrhalis, pneumococcus, one or other variety of staphylococcus, and streptococcus. The Friedlander and proteus are more rarely found, but in my experience are very important. When one has attacked these poisonous microbes with autogenous vaccines, and has watched and weighed the results, one must, I think, arrive at the conclusion that they are the chief factors that maintain and perpetuate the disease. I am by no means claiming that we always get good effects from this treatment, but the number of cases that are either cured or much relieved by this method are so far in excess of the failures that I must come to this conclusion. In fact, I have almost come to the further conclusion that failure is the result of some error either in the selection of the microbes or in the technique of the preparations. The numberless cases that have been cured by vaccine during the last few years should encourage us to further scientific investigation, and the failures should only serve to reveal our defects.

There is one point that I must emphasize in this place—that is, the importance of a good, careful bacteriologist. The preparation of these vaccines, if done in a careless, unintelligent way, will only lead to failure and disappointment; and, what is perhaps worse, will cast a stigma on us and on that subject of our pride, medical science.

I am not speaking like this without good reason, for even in large, well-known bacterial laboratories I have known very poor work done. I am inclined to think that private workers, and preferably medical men, will oftentimes make better vaccines than institutions where individual watching and direction is very difficult. As an example, we who have had any considerable experience of these methods must have come across cases which have been cured by one man's vaccine where another man's has totally failed. It is perhaps hardly necessary to say that all vaccines for this disease should be auto-gogenous; and yet I have known stock vaccines sent out and recommended as equally good. We may say that this is a case of pneumococcus poisoning or of streptococcus, but we are still in the dark as to how many strains or varieties there may be of the same named microbe.

In a few cases of acute pneumonia, where there has been no time to make an autogenous vaccine, I have known a stock vaccine do wonders, but they are quite the exception; in such cases a shot in the dark is justifiable.

Hitherto I have been looking at this disease from the point of view only of the invader, and I have been considering only the destruction of the enemy by our artillery. The wise physician will soon see that this is only part of the problem. The patient who has unluckily got the disease is really the man who has to do the fighting; we can help him much by attacking the enemy from without, but we must also teach him and help him to put his natural defences in order. Strictly speaking, we must look on these poisonous bacteria as foreigners, but as a matter of fact they are almost always with us. Very rarely does a microscopical examination of the mucus of the nose or mouth fail to show the presence of one or other of them, even in health. Our natural powers of resistance, our internal secretions, and our phagocytes, are generally able to deal with them effectually and to ward off their importunities; but it is when these powers fail or are caught napping, when the

bacteria multiply by millions and there is nothing to destroy them, when they pass out of their place and invade the internal organs, that disease is established. The prevention of this failure of resisting power must be our first aim. Overwork, intemperance, improper feeding, exposure to damp and chill, all tend to lower the vitality and to expose us to attack. These we must fight as best we can and as circumstances allow. The enemy is always round the corner waiting for his chance. It is to our frontiers that we must always be looking.

Our most vulnerable points are probably the nose and mouth. The nose in health should act as a dust and germ filter so effectually that no live germ should gain entrance into our system, but the mucous membrane of the nose, especially in impure atmospheres, often becomes irritated and thickened, and proper nose-breathing becomes a difficult thing; then mouth-breathing becomes more or less a habit. This, though a natural passage for air, is not an effective filter. One sees how very liable children with adenoids are to bronchitis and bronchial asthma. The nose, then, is the first point to attend to. The physicians and surgeons who have devoted

themselves to this branch of work can often give us great help, by restoring a proper nasal passage and by attention to the tonsils. There is often a congested, tender spot in one or both nostrils, which seems to act as a centre from which proceed the nerve storms that cause spasmodic asthma. Here, also, hay fever seems to originate. This spot needs great care in treatment, and harm can easily be done; but some of our chief specialists, by their skill, produce in these cases something like a miraculous revolution. Our largest frontier, of course, is the skin, and this many working folk habitually neglect. Their work often causes sweating, and the skin that sweats needs careful washing and protection. They often wear clothes that do not absorb the moisture, and so, when work ceases, their skin is in contact with a damp, chilly material. Much may be done by bathing and after-rubbing with a rough towel to keep the circulation of the skin in a healthy resisting state. Bronchial folk, as a rule, cannot stand a cold bath, and a hot bath often relaxes the pores and leaves them liable to chill. The best plan is to thoroughly wash and soap in hot water and then, standing up with the feet still in the hot water, to have two or three good

sponges down with cold, beginning at the head. This produces a good reaction of the circulation and is a pleasant stimulant. The clothing should be not too light, nor so heavy as to produce perspiration when not at work. Light woollen materials are, I think, the best, but some of the modern cellular makes of cotton seem to answer well.

It is clear, then, that anyone with a tendency to bronchial catarrh or asthma needs to lead a most careful and watchful life; he is incessantly almost open to attack from hostile germs, and every chill weakens his defences. We, on our part, can do much to help these cases by looking to the heart and bloodvessels, the digestion and the kidneys. Many of these patients, especially in middle life, have overstrained, dilated hearts, and often some degree of arterio-sclerosis, and there may be early kidney trouble. The action of the liver often is sluggish, and the organ may be congested; this, of course, causes indigestion and the flatulence which bothers many of them so much. Careful attention to all these points will help much towards cure, especially in conjunction with the vaccine treatment. To gain real success the old therapeutics and the new must go hand in hand.

There is a distinctly gouty form of chronic bronchitis which often alternates with true gout and eczema. This, in the first instance, will only yield to appropriate gouty treatment—alkalies, sulphur, etc.; but even this form becomes bacterial in the end, and the sputum should always be examined. Most of the remedies (and they are almost innumerable) that we have used empirically in the past have acted chiefly as bactericides—for example, the tars, turpentine, terebene, the balsams, the benzoates; the great favourite, iodide of potassium, acts probably in this way, directly by its iodine and indirectly by stimulating the output of thyroid secretion. Chloride of ammonium, again, probably acts in the same way. Antimony, which in the acute early stages of bronchitis was our forefathers' sheet-anchor, and which has fallen out of use far too much, is probably a bactericide (*vide* its action on trypanosomes). While carrying out the vaccine treatment, even if there be no cardiac complication, the patient will need helping in every possible way. Arsenic and iron are often very useful. The judicious use of internal secretion preparations will often help wonderfully. In cases with high tension and threatening arterio-sclerosis,

thyroid will often bring about a better state of general health and help to reduce abnormal deposits of fat about the heart. In others suprarenal extract will do good, especially if arterial tension be low; in others one of the poly-glandular preparations will raise the general tone and resisting power.

When we come to the practical use of vaccines, we have first to find out what the sputum contains—for there will rarely be only one enemy—and then to decide on a single or multiple vaccine. I think we must give the pneumococcus the place of honour. He is as common as any, and perhaps the most easily cured. It is very surprising how many cases of chronic bronchitis, with or without asthma, have pneumococci, even when there is no history of any attack that one can suspect of being true pneumonia. One must, I think, come to the conclusion that many attacks of acute bronchitis are pneumococcic in origin, even when there have been no signs of lung consolidation or of rusty sputum. In the *British Medical Journal* of June 14, 1913, Dr. Pirie, in an article that is very instructive both to the physician and to the bacteriologist, gives the following statistics:

Bacteriology of Sixteen Cases of Chronic Bronchitis without Asthma.

Pneumococci	..	..	..	12 cases
M. catarrhalis	..	..	..	12 "
Staphylococci	..	..	..	5 "
Streptococci	..	..	..	6 "
Friedlander	..	..	..	5 "

In sixteen cases of chronic bronchial asthma he found :

Pneumococci	..	..	..	16 cases
M. catarrhalis	..	..	..	16 "
Staphylococci	..	..	..	8 "
Streptococci	..	..	..	6 "
Friedlander	..	..	..	6 "

The almost universal absence or non-discovery of the influenza bacillus, even with a clear history of a recent attack, is remarkable. The selection will, to a certain extent, depend on the predominance of one or other bacillus in the culture, and, generally speaking, a multiple vaccine, with the possible exception of the pneumococcus, is more likely to be effectual than a single one. The following is the experience of my son, Dr. Arthur Scott, of Bournemouth, who has for the last three years made most of my vaccines:

" Much disappointment and doubt as to the value of vaccines in chronic chest complaints is, I believe, prevalent among the medical

profession. Yet I think that those medical men who have given them, in chronic cases, frequent and prolonged trial become more and more convinced of their general value; I say general value, for one meets with many failures in cases which one thinks would promise well. Granted a definite curative value in vaccines, it becomes difficult to explain their complete failure in certain cases. Making an attempt to group these causes of failure, there is in the first place the unknown condition in some patients that negatives immunity; for example, from an attack of measles one person becomes immune for life, another may get it again in a few months. It seems that there is a failure on the part of some patients to retain their antibodies in the system.

" In a second group, and it is a large one, the vaccine is at fault. In nearly all bronchial cases there is a mixed infection, and the difficulty in choosing from which bacteria to make the vaccine arises. Make a separate vaccine of all the likely bacteria present and mix them together is the apparent solution of the problem, but this entails making subcultures into several generations, and vaccines from subcultures have very little

power of conferring immunity. Probably the most efficient way is to make a solution from the primary culture, then estimate the relative proportions of the varieties of bacteria to each other, by naked-eye examination of the cultures (this is rather guess-work), or where possible by examining a prepared slide of the solution. The predominating variety is then not subcultured, but the varieties occurring in smaller numbers are subcultured and added to the original solution in proportion to the dose required for administration. This method is necessarily faulty, but not more so than the use of impure subcultures of all the varieties. Subcultures can only be obtained pure after several generations have been made.

"Often the method of sterilization of the vaccine destroys its value; for example, a pneumococcal vaccine begins to lose its virtue when heated to 55° C., whereas a staphylococcal vaccine may not be killed at 60° C. This explanation shows that it is not necessarily the principle of vaccination that is the cause of failure, but often the so far insuperable difficulties of the bacteriologist. It is possible that in the future the X rays may help to solve some of these difficulties.

"In a third group error in administration

is the cause of failure. The size of the doses and the intervals between them can only be determined by the patient's symptoms. The opsonic index will not help, as in bronchial cases it is a question of local or tissue immunity rather than of general immunity. Of more importance than all is the duration of the treatment. Most patients are not kept under treatment nearly long enough. It is to be remembered that the bacteria present are probably leading a saprophytic as well as a parasitic existence. This I personally believe to be always the case in chronic bronchitis. Thus the organisms present are living not only on the bronchial epithelium, but also on the bronchial secretions; these are, in the first place, set up by repeated bacterial attacks on the epithelial cells, which are then kept actively secreting by the irritation of the toxins, a vicious circle being thus formed. Hence, if both general and local immunity are obtained, it will not follow that the symptoms of bronchitis will at once disappear; for the saprophytic existence of the bacteria is not only active, but is waiting for lowering of immunity to attack again. For these reasons I think that vaccine treatment of chronic chest catarrhs, etc., should be continued for very

much longer periods of time than is now usually done, so as to allow the bronchial epithelium to regain a normal, healthy condition. I believe that in old-standing cases of bronchial asthma treatment of less than two years' duration is of little use. The vaccines will not need to be given very frequently after the first six months; once a fortnight, or once in three weeks, is generally sufficient."

From my own experience I would further say that in these long-standing cases it is good policy to have a fresh bacterial examination made every six months or so, and if the bacterial conditions have altered, to have a fresh vaccine made. One of the most successful cases I have ever seen is an old lady, now seventy-nine years of age, who lived out of England for many years in the hope of getting rid of persistent bronchial asthma. She finally came to Bournemouth to end her days as a hopeless case. She has been under treatment now for four years, having a vaccine, which is changed from time to time, every fortnight. Under this she has regained a very fair degree of health, and the bronchial asthma is almost cured. Age is no bar to this treatment. Quite old people of seventy-

five to eighty-five do very well and get no alarming symptoms. Children also of two or three years old respond equally well. The most disappointing cases, perhaps, are in overworked, anxious, neurotic, middle-aged folk. Confirmed emphysema has, by some, been thought to be unsuitable for vaccines, but that is not at all my experience. On the contrary, I have seen bad cases of emphysema very much improved, and surely it is only what one would expect; if catarrh, cough, and expectoration are lessened or cured, the lung substance has again a chance to recover its elasticity. As I have said before, pneumococcic cases often respond quickly and well. Catarrhalis cases vary, but are generally rather obstinate, and it is not always easy to find the suitable dose to begin with. Too big a dose will sometimes increase dyspnœa. Staphylococcus cases are generally in conjunction with pneumococci or more often with catarrhalis, and a double vaccine often answers well. Streptococci cases will often need a long course, but do very well in the end. There are two other microbes which are more rarely found—genus *tetragenus* and *proteus*. These make excellent vaccines, and the addition of one or other of them will often cause a pneumo-

or strepto vaccine to succeed perfectly, when before there was failure. In plastic bronchitis the proteus may be found buried in the casts only, and not in the general mass. This microbe will not seldom be found with pneumococci. It is well to begin with a small dose, ten or fifteen millions, and to watch for symptoms of irritation such as increased cough or dyspnoea; a rise of temperature is very rare, and if it occur should cause no alarm. The smaller doses should be given every four or five days. When one has found the dose that does good, it is better, I think, to stick to it, and to give it every ten days or so till one has got the symptoms well under control, and then to carry it on at intervals of every two or three weeks for a year or more.

Many physicians in our large manufacturing towns, where there is always a more or less contaminated, irritating atmosphere, have had poor results with this treatment, and have consequently abandoned it. This is not very surprising, but I have found the cases of failure do very well if the treatment is carried out in a pure air. The constant irritation of the inhaled air or, it may be, continual reinfection, is enough to turn the balance

against the vaccine. This is a case in point: A man of sixty-five was living in Manchester. He came to Bournemouth four years ago in very bad plight—chronic bronchitis, asthma, dilated heart, emphysema, and high blood-pressure. He was unable to lie down and got but little sleep. The vaccine treatment had been forbidden in Manchester, by one of its chief physicians, because he had such marked emphysema and high blood-pressure; the logical process involved in this opinion remains a mystery. He wisely consented to a trial. The sputum contained pneumococcus and catarrhalis. In three weeks he was much better and was able to lie down at night, and what this means none but the sufferers know. In two months he was able to go back to Manchester. Living in such a climate, he has of his own accord had a fresh vaccine made each year, and has a dose about once a month or rather oftener in winter. He has been all this time practically well. He has a little phlegm and is rather short of breath, but is able to enjoy his life quietly. The heart is no longer dilated and his blood-pressure has come down to the normal without any medicinal help. During these four years he has had no medicines for his bronchia.]

trouble. I believe this to be a typical case, and if physicians working in our manufacturing towns would try this treatment, and have it carried out in a pure air, their results, in my opinion, would be as good. A pure air is of more importance than a warm air.

The following case, which I have watched for ten years, is very instructive: A lady, seventy-eight years of age, had had bronchial asthma for many years, resulting in much emphysema; when she came under my care the bronchitis and asthma were so severe and so incessant that she had not been able to lie down for seven years—in fact, she had no bed in her room. The feet and legs were œdematosus, and her life was a misery. I found her sputum contained catarrhalis and Friedlander. Under a vaccine she slowly began to improve. The vaccine was changed from time to time, and in two years she was almost without cough and quite without asthma. The heart and arteries were much affected by the years of strain; the heart was dilated, blood-pressure was often very high, and there was still at times a tendency to œdema of the feet and legs, and shortness of breath on exertion. She suffered much from vertigo and tinnitus. Under hippurates and

strophanthus the conditions gradually improved, but she had two very severe attacks of nose-bleeding. About four years after the treatment began her blood-pressure was generally normal, and she lost her vertigo, but her heart was still feeble. She went on in much the same condition till the summer of 1915, when she got a very bad attack of laryngitis, with some bronchitis but no asthma. She, rather to my surprise, pulled through this ordeal, but her heart was very weak and dilated. In spite of her former high blood-pressure, I gave her suprarenal extract, a 5-grain tablet of the fresh gland three times a day. This acted wonderfully as a circulation tonic, and has never raised the pressure above 140 mm. She does not know what she is taking, but both she and her maid have come to the conclusion, after two or three trials, that she is never well without them, and she has taken three tablets a day almost without intermission for eighteen months. I look on this case as a triumph for modern therapeutics.

It is hardly necessary for me to say that all vaccine treatment should be carried through with strict antiseptic precautions. I find that washing the syringe and needle inside and out with a weak lysol solution is a quick and

safe plan; the patient's skin should be cleaned with the same solution or with iodine. If lysol is left in the syringe, more pain is caused than is necessary; so I wash it out, before drawing in the vaccine, with boiled water. The collection of sputum should be done in the morning, if possible, before food is taken, and the mouth should be washed out previously with hot water, not with any antiseptic wash. The sputum should be expectorated straight into a wide-mouthed bottle with glass stopper that has been sterilized by boiling the previous night, and should be sent with little delay to the examiner.

In many of these cases one will find high tension and early symptoms of arterio-sclerosis; this has been thought by some to contraindicate vaccine, but my experience has, with these cases, been very favourable. The high tension, etc., has been to a large extent brought about by the continual strain of coughing and dyspnoea and by broken rest, and the relief of these will alone lower tension. It is very common for old people who have had a chronic cough to die of a sudden unexplainable pneumonia, without any chill or exposure to infection; these cases are all latent pneumococcic affections. For some reason the resist-

ing power has given way, and the invasion has taken place. Such cases could probably be easily prevented by the occasional use of pneumococcus vaccines, for the microbe could have been detected in the sputum of the chronic state.

Further, arterio-sclerosis is thought by many to be caused in some cases by auto-intoxication from the abnormal bacteria of the digestive tract; is it not reasonable to think that it may be caused also by auto-intoxication from the abnormal bacteria of the respiratory tract? Whatever the cause may be, you will generally have the satisfaction of seeing the high tension satisfactorily subside, with all its accompanying symptoms, and this will take place without using any depressor remedies.

With such a varied pathological cause for the group of morbid symptoms that we call bronchial asthma, is it reasonable to expect that any medicinal course of treatment, either by the stomach or by inhalation, can ever effect a radical cure, or have any but a passing action? A symptom here and there can be relieved and the patient made more comfortable (*vide* the endless list of patent and proprietary cures that are no cures). As scientific men we should go, if possible, to

the roots of the disease, and the modern science of bacteriology is helping us to do this most effectually. We have much to learn, and something to unlearn, but patience and honest work will produce undreamt-of results. Finally, I look on this treatment as a true and logical extension of my dream—organic or endogenous therapeutics.

